

A STUDY ON DECISION MAKING IN MANAGING MAINTENANCE AND
BUILDING SERVICES IN MILITARY ORGANIZATION

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BACHELOR DEGREE OF PROJECT MANAGEMENT
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A STUDY ON DECISION MAKING IN MANAGING MAINTENANCE AND BUILDING
SERVICES IN MILITARY ORGANIZATION

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of degree of Bachelor of Project Management with honour.

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STUDENT'S DECLARATION

I hereby declare that the work in this project is my own except for quotations and summaries which have been duly acknowledge. The project has not been accepted for any degree and it is not concurrently submitted for award of other degree.

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DEDICATION

Praise to almighty ALLAH for helping me in completing this thesis. This thesis is dedicated to my family especially to my wife and son's for their sacrifices and always by my side in supporting me throughout my study and completing this thesis in particular. This thesis is dedicated to my supervisor, experience lecturer Mr. Azizan bin Hj Azit who always guides and supports me to complete this FYP1 and FYP2, my lecturers and academic advisor, Dr. Mohd Ridzuan bin Darun. In addition, this thesis is dedicated to my friends and colleagues who have assist me for my research.

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Not to forget, my special thanks to the Commander of 4 Briged Mechanized, staff and a unit's for their cooperation and given permission to enter the camp in doing my research. This research was conducted in win-win approaches whereby the residents get the benefit, and at the same time to uphold organization's reputation. Thus, the finding can be used to enhance their management in future.

I am also wish a very thankful to my beloved wife and son for their pray and support from them. They, who always enlighten me in doing my research project, encourage me to be more motivated. Never forget for my friends and colleagues who always there for helping me and sharing the information about the FYP 2. Thanks you very much and May ALLAH bless you forever.

ABSTRACT

Maintenance of assets particularly a building is an important as to maintain the high moral of soldiers and to uphold their standard of well-being. Poorly maintained buildings will somehow tarnish the image of Malaysian Armed Forces (MAF). Recently, the maintenance works carried out were questionable as there were many complaints among the occupants. This research was conducted with the aim to identify the management approach on decision making focusing on the servicemen and servicewomen who are lived in the military married quarters (RKAT) under 4 Briged Mechanize, Kem Batu 10, Kuantan, Pahang. The research objective is to identify the management approach on decision making and to evaluate the existing maintenance process, ultimately determine the relationship between independent variable and dependent variables. This study will focus on the management, housing condition and the maintenance work particularly on a military organization. This research aims to improve the value of buildings through a proactive maintenance and management system that is based on the concept of value for money. The methodology has made use of questionnaires to get the feedback from respondents for data collected to be unbiased and shared a common interest. The study come across useful information from data analysis that all the variables; decision making, building maintenance, quality maintenance and budget allocation have a degree of relationship, and the variables indicates that there are positively and negatively correlated each other's. Thus, it signifies a moderate to strong positive relationship related with effective decision making.

ABSTRAK

Setiap bangunan perlu diselenggara bagi memastikan ianya dapat berfungsi dengan baik. Penjagaan yang terancang dan berterusan dapat menjaga kualiti dan prestasi bangunan tersebut. Anggota tentera dijaga kebajikan mereka dengan memberikan perkhidmatan senggaraan bangunan yang berterusan demi menjaga moral dan memberi keselesaan kehidupan yang standard. Sejak kebekangan ini, kerja-kerja senggaraan telah menjadi isu dan ketidakpuasan hati dikalangan penghuninya. Justeru, kajian ini adalah bertujuan untuk mengenal pasti pendekatan pihak pengurusan keatas keputusan yang dibuat dengan memberi tumpuan kepada anggota tentera yang berkeluarga yang tinggal di Rumah Keluarga Angkatan Tentera (RKAT) di bawah naungan 4 Briged Mekanise, Kem Batu 10, Kuantan, Pahang. Objektif kajian adalah untuk mengenal pasti pendekatan pengurusan terhadap keputusan yang telah diambil, dan menilai proses penyelenggaraan yang sedia ada, seterusnya menentukan hubungkaitnya dengan faktor pembolehubah – pembolehubah yang ditetapkan. Kajian ini akan memberi tumpuan kepada pihak pengurusan, keadaan perumahan dan kerja-kerja penyelenggaraan khusus terhadap organisasi tentera. Kajian ini bertujuan untuk meningkatkan nilai bangunan melalui penyelenggaraan dan sistem pengurusan yang proaktif berasaskan kepada konsep nilai untuk wang. Kajian ini telah menggunakan kajian selidik untuk mendapatkan maklum balas daripada responden bagi data yang dikumpul sebagai tidak berat sebelah dan berkongsi kepentingan bersama. Kajian ini mencari maklumat yang berguna daripada analisis data dimana semua pembolehubah; membuat keputusan, penyelenggaraan bangunan, kualiti penyelenggaraan dan peruntukan kewangan agar mempunyai tahap hubungan, dan pembolehubah menunjukkan bahawa terdapat kaitan yang positif dan negatif antara satu sama lain. Oleh yang demikian, hasil kajian menunjukkan terdapatnya hubungan sederhana dan kukuh yang positif terhadap keberkesanan keputusan yang diambil.

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LIST OF ABBREVIATIONS

BPKP	Bahagian Pembinaan dan Kejuruteraan Pertahanan
DCED	Defence Construction and Engineering Division
DV	Dependent Variable
IV	Independent Variable
JKR	Jabatan Kerja Raya
MAF	Malaysian Armed Forces
MA	Malaysian Army
MQ	Married Quarters
PWD	Public Works Department
RKAT	Rumah Keluarga Angkatan Tentera
SERVQUAL	Service Quality
SPSS	Statistical Package for Social Sciences
SOP	Standard Operating Procedures
TD	Tentera Darat

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

People well-being was influence the place of standard living Housing has an important element that influence to the well-being of the people and it is a major economic asset for all nations (Olapado, 2006). According to Foster (2000), secured communities and social inclusion start with quality housing. However, it is common for any residential buildings to have to confront with the problems of building decay and deterioration, which are inevitable through the effects of usage, wear and tear (Ozdemir, 2002). In order to extend the life of the building, it is vital to have proper maintenance so that all negative effects can be reduced or eliminated (Chew et al., 2004). Maintenance concerns with preserving the building so that it is suitable for its use (El-Haram & Horner, 2002). It seeks to extend the life of the building elements thus an appropriate operation is necessary to prevent the condition of the building from continuously deteriorating (Hui, 2005). Therefore, maintenance can be defined as *work carried out either in the form of repairing, restoring and improving every facility to make sure the building is in good condition.*

This chapter will elaborate the highlighted of research topic on military environment as background of the research. The background of study will promote an issue related to the military organization emphasizing on married quarters (RKAT) and the effective of the management and maintenance work. Then, it follow by evaluate the maintenance procedures and, lastly a conclusion. It's identifies the building conditions of married quarters and the Standard Operating Procedures (SOP) applied of building maintenance by the military organization. The assessment of the existing procedures customize in managing maintenance and building services focusing in two different implementing agencies; Public Works Department (JKR) and Defence Construction and Engineering Division (BPKP).

1.2 BACKGROUND OF STUDY

The Malaysian Army (MA) has existed since 82 years ago with the formation of the First Company Malay Regiment under the British Government who ruled Malaya at that time. All infrastructure and facilities at the camp was designed and developed by the British. When the British withdrawal in the early 60s, it's gradually involves the acquisition of the assets left including camps and other infrastructure and facilities. Consequently, the requirements in terms of designed, build and maintain the asset inherited from the British military has been the responsibility of the MA.

However, since the acquisition of the British force, needs maintenance, improvement and development of the MA's infrastructure was unable to be properly planned and orderly due to constantly decreasing budget allocation of the amount requested. Apart from the need to plan the development of new camps were not given priority as the situation of camps and facilities available at the time it was still in good condition and still not require major maintenance. Therefore aspect maintenance, improvement and development also implemented "peace-meal" only where the concentration needs are given priority and emphasis is focused on the needs corrective action only.

Condition of buildings and infrastructure is becoming deteriorating increasingly frail and weak and no longer is relevant to the current requirements both in terms of design, layout and functionality of the facility itself. Until now there are many camps and buildings, including the married quarters (RKAT) which has the characteristics of colonial feudal system that no longer suitable with the life of the MA citizens with single/double room and has a separate kitchen.

In terms of financial aspect, the trend of the last days has demonstrated that the allocation given to the MA particular maintenance is an average of 50% of the amount requested. Based on these factors, a lot needs maintenance and development cannot be realized as planned and these conditions have a negative impact on the development of the MA especially soldier's family. Thus, with the current situation in line with the modernization the organization need to think of their welfare of it citizens to develop infrastructure and facilities in the camps and more planned along with the growth and progress of the MA toward the nation vision of 2020.

1.3 PROBLEM STATEMENT

The quality of maintenance depends on how much money spending toward the assets are related in decision making of the management and the value of the building. If the management follows the maintenance works and scheduling properly, the value of the building will long lasting and downgrade if otherwise. It always cost-effective managing a properly maintenance works rather than reconstruct a new building as substitutes.

The managing maintenance and building services systems currently practiced via a piece-meal, instead of holistic planning as a whole. Notwithstanding in maintenance, suppose there is a connection between the management and the user involved before come to the conclusion of decision making by the management upon agreement for the maintenance take place.

1.4 RESEARCH OBJECTIVES

- 1) To identify the management approach on decision-making in implementing maintenance work.
- 2) To evaluate the current practices of the existing maintenance procedure used in the maintenance process.

1.5 RESEARCH QUESTIONS

- 1) What are the management approaches on decision-making in implementing maintenance work?
- 2) What are the current practices of the existing maintenance procedure used in the maintenance process?

1.6 SCOPE OF STUDY

This research will focusing on a military base, concentrating the married quarters (RKAT) under 4 Briged Mechanize, Kem Batu 10, Kuantan, Pahang. This formation has two different married quarters; RKAT Kem Batu 10 consists of 1,072 units under implementing agency of *Public Work Department (JKR)* and Desa Tentera Darat (TD) Sungai Pancing consists of 306 units under implementing agency of *Defence Construction and Engineering Division (BPKP)*. This study is mainly applies to the servicemen and servicewomen who are lived in the married quarters with different rank structure and type of accommodation. This study will focus on the management, housing condition and the maintenance work.

1.7 SIGNIFICANCE OF STUDY

This study will cover the understanding and the important of the maintenance system, the management process/existing procedure and the maintenance work by the implementing agency. The finding from this study can be used by top management/commanders to recognize the issue on management, maintenance work and the satisfactory of the residents. In future, the MA hierarchy and authority concern in this study can get benefit from this research to overcome the management of maintenance work in the organization. Eventually use this research as reference in future.

1.7.1 Theoretical Framework of Hypothesis Development

The purpose of this study is to find out whether there is a relationship between service quality (SERVQUAL) and effective decision making. The researcher's model for this study is represented as in Figure 1.7.1. The figure illustrates that the service quality may or may not have direct relationship with effective decision making.

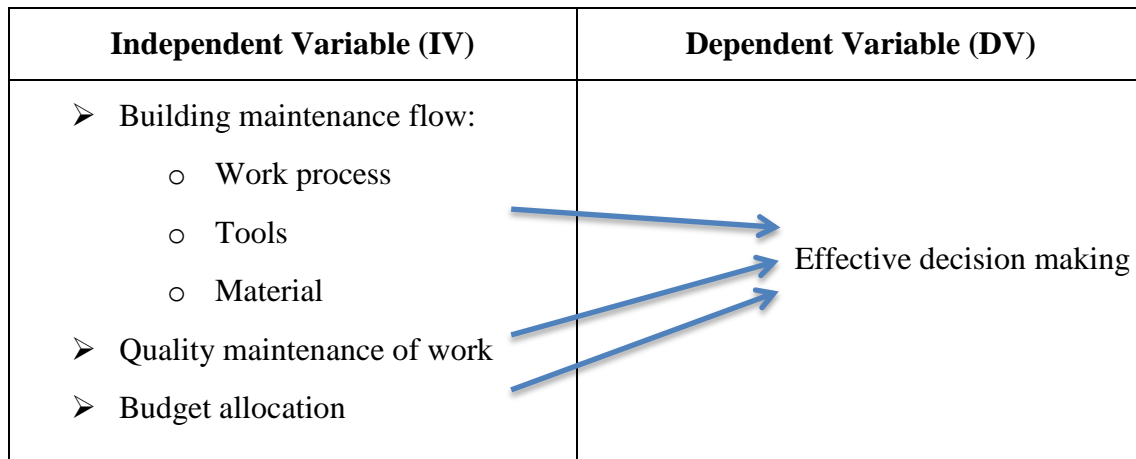


Figure 1.7.1: SERVQUAL Model

The framework shows that the independent variable is service quality. Measurement of service quality is SERVQUAL model. They are building maintenance work flow, quality maintenance of work and budget allocation of maintenance work in an Independent Variable and effective decision making as Dependent Variable.

1.8 EXPECTED RESULT

The aim of the study is identify and conduct and assessment the managing maintenance work and building services particularly on a military organization with the aim to improve the building condition along with properly maintenance work and cost-effective. In Malaysia, building maintenance is conditionally driven and is usually carried out only when there is money, even if the needs are obvious until such a situation when the building becomes unattractive or even unsuitable for its users and the populace. As such, building maintenance is not regarded as part of the production processes, that is, not as a factor of production. Therefore, a broad concept and systematic approach and procedures are required in maintenance works and building services by involving the users in the planning, controlling and implementing of maintenance as a whole process.

1.9 CONCLUSION

The effective of the building maintenance can be measure through the result of the work and optimized cost-effective. The user will be benefitted by the good condition their house. Better management will contributes through a proactive maintenance with the concept value for money. The performance of the building will justify user's standard of living condition and less complaint. Thus, user should play an important role in managing maintenance and building services for the betterment of the system.

Buildings that require maintenance in the MA organization especially married quarters are increase from time to time. The old building still maintain with a maintenance work while the new complex for married quarters continue developed. Thus, it's exit two different condition of housing; the old quarters required highly maintenance work whereas the new quarters in good condition and less maintenance work but the management which is responsible for both quarters remain the same. With this situation exit, decision-making and priority of maintenance work will be questioning.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In order to conduct the study, it is important to review the aspects related with topic. Therefore, this chapter is reviewing a decision making and the model, the building maintenance management in various perspectives. Besides, this chapter covers the camps maintenance and building services, particularly in military organization. In addition, this chapter describe a quality of maintenance and the budget allocation of managing in maintenance work in an organization.

2.2 DEFINITION OF DECISION MAKING

Decision making is a process of making a choice from a number of alternatives to achieve a desired result (Eisenfuhr, 2011). Three elements identifies in decision making; making a choice from an options, final choice and the end-state a desired result in order to reach a final decision. Two basic models highlighted as Rational Model and Bounded Rationality Model (March, 2010).

2.2.1 The Rational Model

Administrative decision making is assumed to be *rational*. By this we mean that an organizational make decisions under certainty: They know their alternatives; they know their outcomes; they know their decision criteria; and they have the ability to make the optimum choice and then to implement it (Towler, 2010). According to the rational model, the decision making process can be broken down into six steps (Schoenfeld, 2011), as shown as Figure 2.2.1.

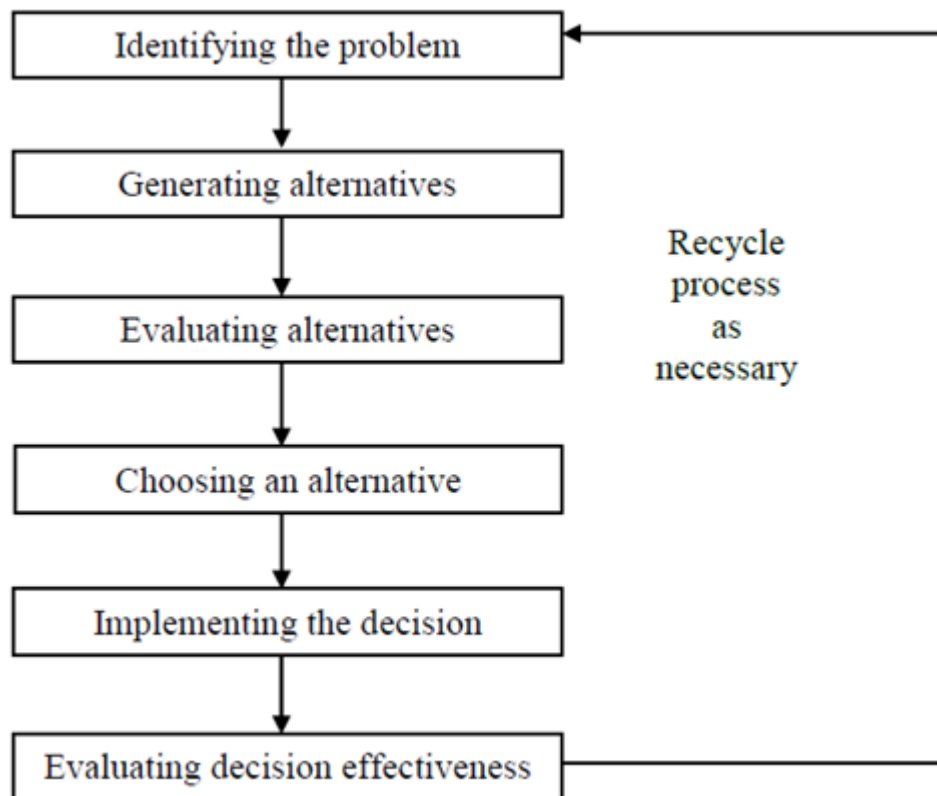


Figure 2.2.1: The Decision-Making Model

After a problem is identified, alternative solutions to the problem are generated. These are carefully evaluated, and the best alternative is chosen for implementation. The implemented alternative is then evaluated over time to assure its immediate and continued effectiveness. If difficulties arise at any stage in the process, recycling may be effected. Thus, we see that decision making is a logical sequence of activities. That is, before alternatives are generated, the problem must be identified, and so on. Furthermore, decision making is an iterative activity.

2.2.2 The Bounded Rationality Model

The organizational are not aware that problems exist. Even when they are, they do not systematically search for all possible alternative solutions. They are limited by time constraints, cost, and the ability to process information. So they generate a partial list of alternative solutions to the problem based on their experience, intuition, advice from others, and perhaps even some creative thought. Rationality is, therefore, limited. According

(Herbert Simon, 1982, 1997 and 2009) coined the term *bounded rationality* to describe the decision maker who would like to make the best decisions but normally settles for less than the optimal. In contrast to complete rationality in decision making, bounded rationality implies the following (Simon, 1982, 1997 and 2009):

- a) Decisions will always be based on an incomplete and, to some degree, inadequate comprehension of the true nature of the problem being faced.
- b) Decision makers will never succeed in generating all possible alternative solutions for consideration.
- c) Alternatives are always evaluated incompletely because it is impossible to predict accurately all consequences associated with each alternative.
- d) The ultimate decision regarding which alternative to choose must be based on some criterion other than maximization or optimization because it is impossible to ever determine which alternative is optimal.

2.3 COMPLEXITY OF DECISION MAKING

Decision-making is one of the most fundamental components of effective management and leadership. As organizations continue to experience intensified competitive pressures associated with globalization, rapid technological innovation, shorter product life cycles, and shifting demographics, the ability to make effective decisions becomes even more imperative. The complexity of decision-making is evident in the numerous theories, methods, and tools devoted to improving the decision-making process. For example, the rational or traditional approach to making decisions embodies an intuitive set of four steps including, problem identification/definition, identification of alternative solutions, selection of alternatives, and evaluation. In contrast to this logical method of decision-making, the systems method takes a much more holistic approach, considering the complex interactions between internal and external factors before reaching an optimal decision. Regardless of the methodology or tools used to make decisions, evidence suggests that applying a systematic approach significantly enhances overall quality of consequent decisions.

2.3.1 Organizational Cultures and Decision Making Styles

An organizational culture was determined by societal states with the other critical dimensions generated. However, appropriateness decision making determined by the style of performance of various functions and congruency between them is a pre-requisite for managerial effectiveness.

In decision making, it is not only the quality of the decision which is important, but also the way it is made – the process. For societies at the traditional stage, key decisions are likely to be made by the superior and handed down. As societies move along take-off, superiors need to consult with subordinates (vanguard organizational systems) in the most synergistic work cultures. However, the direction from the top is necessary to enhance organizational capabilities and decisions which should be made by other administrators at other levels in the organization.

According (Tannenbaum and Schmidt, 1973) continuum of leadership styles outlines a seven-option range from authoritarian to democratic types. This continuum, adjusted for decision making, is presented in Figure 2.3.1.

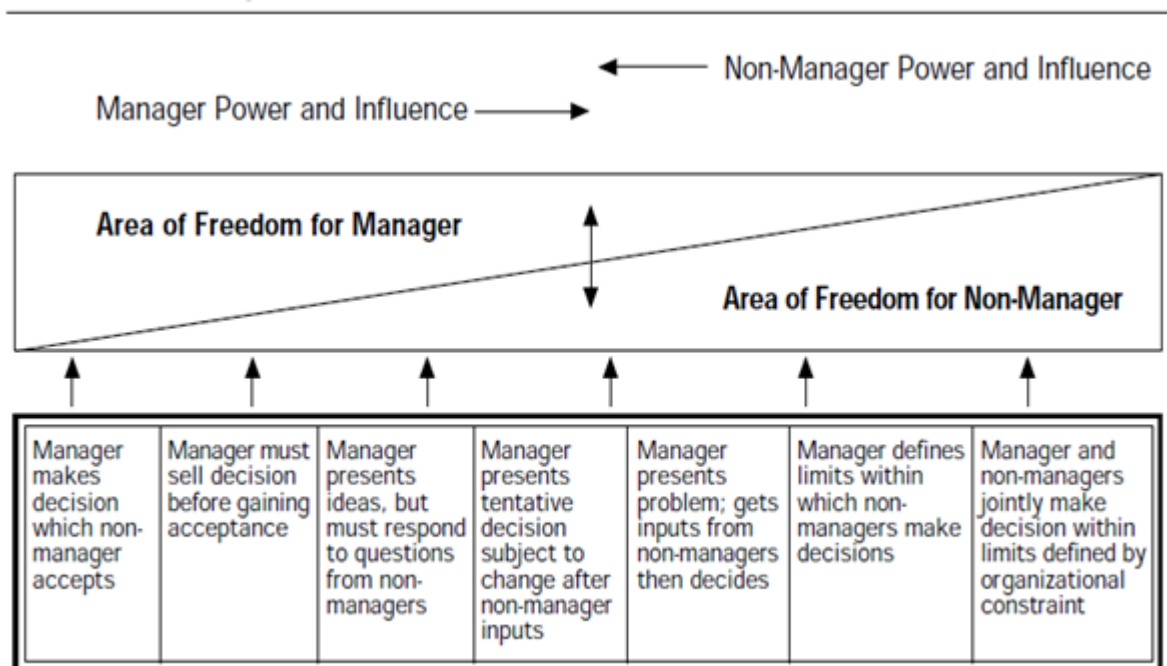


Figure 2.3.1: Decision-Making Continuum

- a) Paternalistic (Dictate). The style is close to the left end of the continuum and leader makes a decision and either announces it and forces it on the organization
- b) Bureaucratic (Directive). The style co-alignment with its domain and executive level makes an appropriate decision while receiving inputs from others impacted by the decision.
- c) Synergistic (Deliberate). The style is toward the right hand extremity of the continuum. People with knowledgeable and potentially involved in making decisions. Figure 2.3.1.1 is explained the diagram depicted.

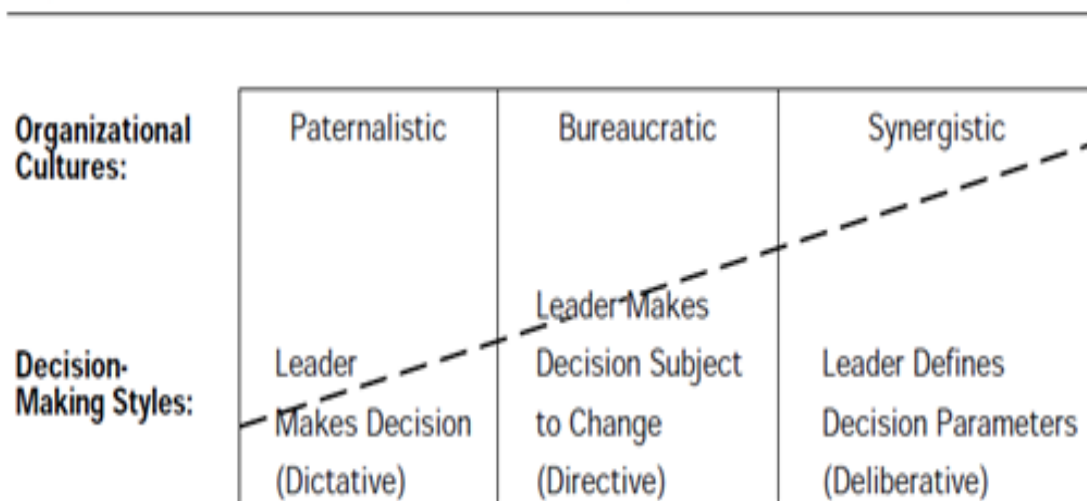


Figure 2.3.1.1: Organizational Cultures and Decision-Making Styles

2.3.2 Hypothetical Relationship between Leadership Style and Decision Making Style

Decision-making styles are related to leadership. Transformational and transactional leadership gravitate to different decision styles. As noted earlier, *transformational leaders* are charismatic, intelligent, and inspire their followers to question the status quo and seek new possibilities. Transformational leaders try to synthesize and integrate as much information as possible in order to form their vision and galvanize their followers. Therefore, transformational leaders adopt a more integrative or comprehensive decision style. *Transactional leaders*, on the other hand, tend to focus on the task at hand and try to solve immediate problems. These characteristics of transactional leaders are associated with a less comprehensive decision style and reflect a style that restricts the amount of information that is processed (Eberlin, 2005; Kedia et al., 2002; Tatum et al., 2003). Figure 2.3.2 shows the connection between leadership and decision styles that is consistent with both evidence and theory.

		Decision Style	
		Restricted	Comprehensive
Leadership Style	Transactional	Strong Relationship +	Weak Relationship ○
	Transformational	Weak Relationship ○	Strong Relationship +

Figure 2.3.2: Connection between Leadership Styles and Decision-Making Styles

2.4 BUILDING MAINTENANCE

Building maintenance is complex both technical and administrative activities. In order to make the building perform as such, effective maintenance works need to carry out in a proper way. According (Francis et al., 2001), building maintenance management is inter-related with technical aspect, user societal, legal and financial implication in managing maintenance buildings. It's can be defined as *“work undertaken in order to keep, restore or improve every part of a building, its services and surrounds, to a currently accepted standard, and to sustain the utility and value of the building”* (Seeley, 1976). The objectives of building maintenance according (Alner and Fellows, 1990) as follows:

- a) To ensure the buildings are safe and fit for use.
- b) To ensure the buildings condition meeting standard requirements
- c) To carry out the proper maintenance work with cost-effective.
- d) To maintain the quality of the building.

Building maintenance needs a strategy and bold decision taking into considerations. This is due to reducing the cost of maintenance and meanwhile to upgrade the standard of the building by mistakenly repeat the same works whether to repair or replace, to carry out periodically maintenance works or to respond the requests of the users. Building maintenance can be segregate into corrective, preventive and condition-based.

2.4.1 Corrective Maintenance

Corrective maintenance is the simplest type of maintenance strategy, where an element in a building is used until it breaks down. It covers all activities, including replacement or repair of an element that has failed to a point at which it cannot perform its required function. Corrective maintenance is sometimes referred to as failure-based or unplanned maintenance and often takes places in an ad hoc manner in response to breakdowns or user requests (David and Arthur, 1989).

2.4.2 Preventive Maintenance

Preventive maintenance was introduced to overcome the disadvantages of corrective maintenance, by reducing the probability of occurrence of failure and avoiding sudden failure. This strategy is referred to as time-based maintenance, planned maintenance or cyclic maintenance. Preventive maintenance tasks are performed in accordance with a pre-determined plan at regular, fixed intervals, which may be based for example on operating time.

2.4.3 Condition-Based Maintenance

Condition-based maintenance is defined as “*Maintenance carried out in response to a significant deterioration in a unit as indicated by a change in monitored parameter of the unit condition or performance*” (Kelly and Harris, 1978). The condition-based maintenance concept recognizes that a change in condition and/or performance of an item is the principal reason for carrying out maintenance. Thus, the optimal time to perform maintenance is determined from a condition survey used to determine the actual state of each constituent item in a building.

2.5 COST DECISION MAKING

Budget allocated influenced the quality of maintenance works and result. Management performance and right decision making will ensure the quality standard of the building besides sufficient resource; budget and skills labour available for maintenance works (Lee and Scott, 2009). Therefore, it is the responsibility of organizational management to provide an allocation of maintenance cost in order to produce better end-state or desired results (Mjema, 2002).

Budget estimation for allocation cost is complex and transparency. A different building has different budget allocation and varies for the existing significant building in nature difficult to predict. It's essential to gain advice from experts by identifying the dominant factors and information peculiar to the maintenance cost. This is where the important of management personnel to consider the degree of risk and mitigation plan in future.

2.6 DECISION MAKING IN MAINTENANCE COST

Rahmat (1997) defined decision making as *a study of identifying and choosing alternatives based on the values and preferences of the decision maker*. Decision making is an essential element to building maintenance works and the central role of building management. Hence, decision-making is synonym important to examine the allocation of maintenance cost (Rahmat, 2008).

In maintenance works, any decisions made have implications on cost, quality, duration, and resource allocation of the buildings (Ali et al., 2008). Adequate data and accurate information is paramount in order to produce good and quality decisions. According (Kam and Fischer, 2004), without a sufficient data, it is impossible for the maintenance management to make correct decisions.

Additionally, lack of maintenance knowledge and experience on building management and personnel involved and inadequate building inspections consequences the implementation of maintenance works, which could cause deficiencies in decision making. Hence, identifying the criteria in decision making is paramount to ensure the quality of the decision outcome. In order to keep the building in good shape in condition, and performance, cost of maintenance covers the overall cost or budget. According (Lee and Wordsworth, 2001) the main objective of maintenance management organisation is to ensure the required or acceptable standards and level of services provided in the building continuously at the minimum cost. However, Chanter and Swallow, 2007; stated that the cost of maintenance works are higher than the cost to rebuild a new facility works due to various factors as stated below:

- a) Diseconomies of scale due to small scale of maintenance work.
- b) The need to striping out the existing work before repair or replacement work.
- c) Maintenance work has to be carried out in confined or occupied spaces, areas of places.
- d) The cost of clearing away is disproportionately high.
- e) Substantial disturbance costs of the building and effect loss of production.

The continuous increase in housing maintenance costs become an issue for the housing maintenance costs management. Therefore, the management should come out with a strategy such as minimise the maintenance tasks in order to reduce the maintenance cost. According to (El-Haram and Horner,(2002), there are several factors that affect the housing maintenance cost. Generally, they can be divided into five main groups, as shown in Figure 2.6.

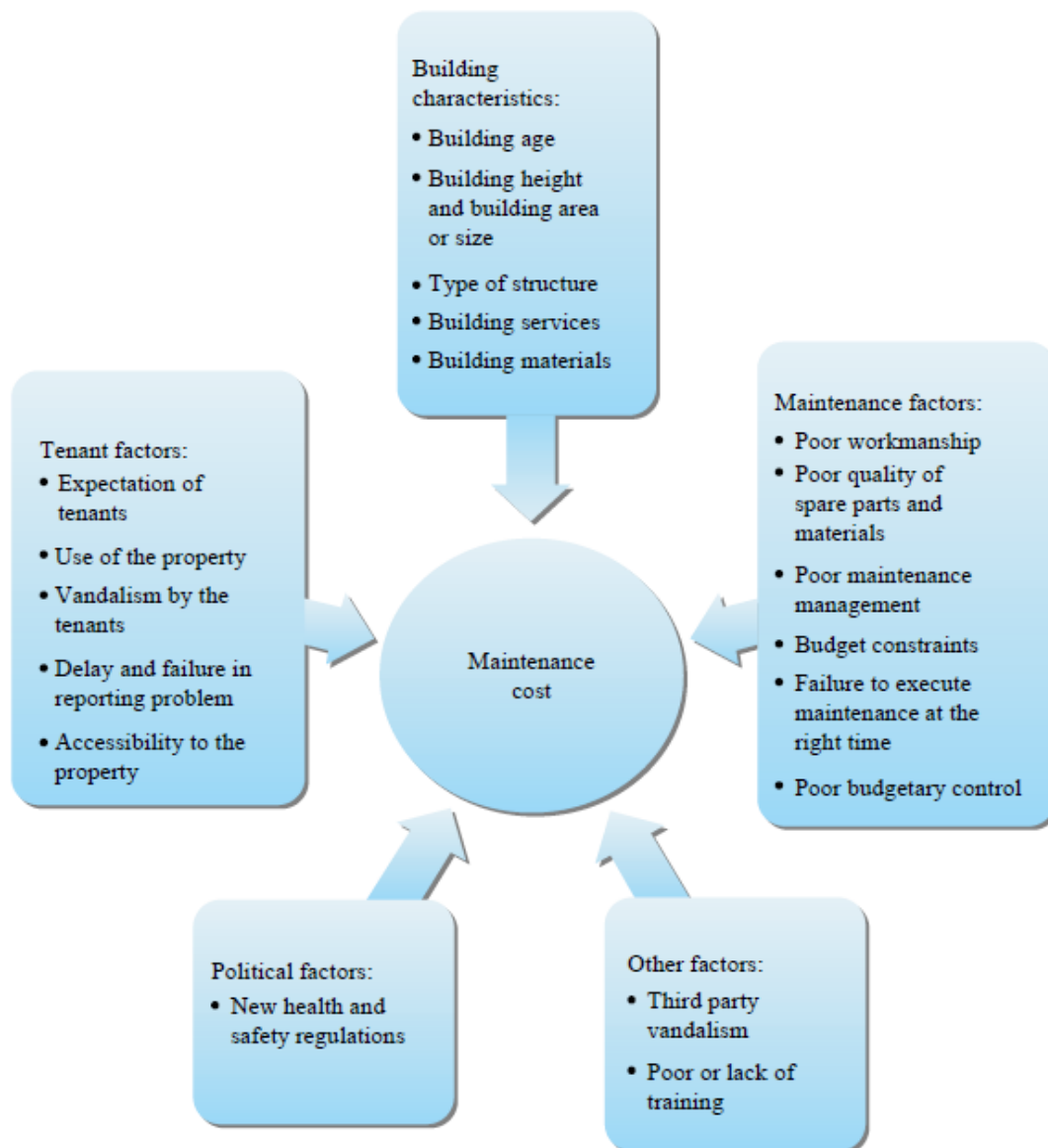


Figure 2.6: Variable of Factors Affecting Housing Maintenance Cost

2.6.1 Building Characteristics

Building characteristics always have an influence on the maintenance costs (El-Haram and Horner, 2002). Basically, building characteristics include the building age, function, building or unit area, height of building, type of structure, finishes, services, building materials and others. Every building has its own characteristics and this makes the buildings require different amount of maintenance costs distribution and allocation to be maintained in good condition.

- a) Building Age. According to (Slater, 1982) and (Skinner, 1982), maintenance costs has connectivity with the age of a building; maintenance costs and building age simultaneously increasing. When the age of a building increase, ultimately maintenance cost higher (Wong, 2002).
- b) Building Height and Building Area or Size. The higher the building will cause, additional maintenance costs especially for the tools and equipment used to carry out the maintenance tasks (Skinner, 1982).
- c) Type of Structure. A maintenance cost affects the type of structure of a building that require big amount of resources particularly financial aspects for inspection, evaluation and rehabilitation to ensure safety (Neves et al., 2004).
- d) Building Services. According to (John and Clements-Croome, 2005), building services systems are generally installed in buildings to provide a healthy and safe living environment for the occupants or residents. According to (Lam, 2001), building services is a vital aspect to be concerned in building maintenance management, especially the mechanical and electrical services, which are the active components in a building.
- e) Building Materials. Origin building materials contribute an effect on maintenance costs for repair or replace the existing building components. According to (Shabha, 2003) proved that the incompatible and poor quality materials used in construction and lack of regular-planned maintenance has caused the deteriorations or defects occurred in the building components.

2.6.2 Tenant Factors

According to (El-Haram and Horner, 2002), tenant influence have an impact on the maintenance cost such as *expectation of tenants or residents, use of the property, vandalism by the tenants, delay in reporting failures, complete failure to report problems, as well as accessibility to the property*. According to (Olubodun, 2001), 25 per cent of total maintenance needs could be due to the tenant influence.

- a) Expectation of Tenants. Housing maintenance cost has significantly affects high expectation of tenants due to the rising demands and high standards from tenants and residents for better living environments.
- b) Use of the Property. The maintenance and repair cost will gradually increase due to improper use of the property thus cause damages. According to (El-Haram and Horner, 2002), by introducing property operating manuals and rules, and educating tenants and residents this problem can be reduced.
- c) Vandalism by Tenants. Vandalism consequently influenced the maintenance cost for repairing defect and faulty on building components. According to (Olubodun and Mole, 1999), vandalism is one of the factors that cause the defects. Meanwhile, (Bavani, 2010) found that RM 2.5 million was spent by Kuala Lumpur City Hall (DBKL) solely for repairing faulty lifts.
- d) Delay and Failure in Reporting Problems. Early action to the building failure could reduce the maintenance cost. Notwithstanding, fast reaction to the building defect or failure cannot be implement if there is a delay and failure in reporting the problems. According to (Lee and Wordsworth, 2001), the rate of deterioration of the component and the corresponding increase in the cost of rectification is likely without early response to such defect.
- e) Accessibility to the Property. According to (El-Haram and Horner, 2002), inability to gain access to the property is main factors that affect housing maintenance cost. According to Al-Arjani (1995), a cultural issue is one of the reason and obstacle for maintenance staff from doing their tasks

2.6.3 Maintenance Factors

Maintenance factors, an interaction of technical and administration factors are likely to have great influence on housing maintenance costs (El-Haram and Horner, 2002).

- a) Poor Workmanship. Poor workmanship during the implementation of maintenance tasks is greatly affecting the maintenance cost due to more defects will occur immediately or after the period of time the maintenance works are done. Then, further and additional remedies might be required to treat such defects. Hence, the total maintenance costs are likely to be increased as a result of poor workmanship during the implementation of maintenance works. According to (Khalid et al., 2006) poor workmanship is the predominant cause of defects emerging on the projects or maintenance works.
- b) Poor Quality of Spare Parts and Materials. According to (Al-Hammad et al., 1996) the problems related to the lack and poor quality of spare parts and materials used in the building components, elements, services or facilities significantly influence the maintenance costs.
- c) Poor Maintenance Management. Maintenance management quality is always an issue that significantly affects the housing maintenance cost. According to (Horner et al., 1997), the poor maintenance management practices are neither cost effective nor optimum, and often cause a lot of problems, such as defective building, poor building functionality and others. Hence, the effective maintenance management can minimise the operating and maintenance costs, while the building continues to function and operate efficiently.
- d) Budget Constraints. Due to the budget constraint, always happened a delay of some maintenance tasks (El-Haram and Horner, 2002). While, according to (Pascual et al., 2008) the asset or building failure rate increases as time passes and this produces more repair and maintenance tasks ultimately not sufficient to cover the need for maintenance.

- e) Failure to Execute Maintenance at the Right Time. (According to Narayan, 2003), failure or delay to execute maintenance actions at the right time may cause further implications of excessive damage, wear and defect and as a result, could increase in-material and labour costs while additional maintenance and repair requires in future.
- f) Poor Budgetary Control. Budget controlling in maintenance activities is essential to manage the maintenance cost expenditure. Quality of maintenance activities often affects the housing maintenance cost. According to Ali (2009), the quality of maintenance activities is influenced by the amount of budget allocation in each task. In fact, sufficient resources especially finance is needed for maintenance work to have good maintenance actions and to sustain the required standard of building functions (Lee and Scott, 2009).

2.6.4 Political Factors

Changes of political situation could affect the housing maintenance cost in some aspects, According to (El-Haram and Horner, 2002) proved that the political factors considerably affect the housing maintenance cost in Malaysia. The variables include right to buy policy, new health and safety regulations and poor management

2.6.5 Other Factors

According to (El-Haram and Horner, 2002), third-party vandalism and poor or lack of training also can contribute other factors that affect the housing maintenance cost due neglected by maintenance management personnel.

- a) Third Party Vandalism. According to (Tiun, 2003), vandalism is one of the serious problems observed in many high-rise residential buildings. Third-party vandalism is one of the factors that affect housing maintenance cost. This factor has been proven by (El-Haram and Horner, 2002) stated that third-parties have no relationship or interest to a building.

- b) Poor or Lack of Training. Poor operating and maintenance practices often lead to human error and consequently the occurrence of poor quality of maintenance outcomes and likely to have an impact on the housing maintenance cost. According to (Pascual et al., 2008), maintenance personnel or operator's skill is an essential factor that influences the maintenance performance and this statement supported by (Narayan, 2003) stated that lack of maintenance personnel training is one of the reasons for poor operating practices in maintenance management.

2.7 MAINTENANCE AND BUILDING SERVICES IN MILITARY ORGANIZATION

2.7.1 Introduction

Maintenance can be viewed as a service activity and, in this respect, a military maintenance organization can be regarded as a service organization. Although maintenance is normally viewed as a routine and unglamorous activity, its importance cannot be de-emphasized. Observations of existing maintenance services in the military have revealed much room for quality improvement. To begin with, maintenance objectives and tasks are often ill-defined. Maintenance personnel are poorly motivated while the traditional management's attitude towards maintenance is generally misdirected and not useful for monitoring purposes.

2.7.2 Nature and Quality of Maintenance Services

The methods being used for maintenance of camp and ATM facilities have been enshrined by the *Order of the Malaysia Armed Forces (ATM), Volume III, Chapter 13, Housing and Construction* has outlined so that all the buildings and facilities in the military camp were in the good shape and condition that can be used at all time. Thus, the nature and scope of maintenance services can best summed up by the questioning as follow:

- a) What maintenance has to be done?
- b) When maintenance has to be done?
- c) Where maintenance has to be done?
- d) Who is to do the maintenance?
- e) How the maintenance is to be performed?

The MA has three types of camps as stated a references and guidance are based on the above order and are categorized as follows:

- a) Permanent Camps. The camp consists of mostly technical buildings, residential and facilities that remain. The buildings, was built using construction materials such as rock solid brick / concrete with reinforced concrete frame.

- b) Temporary Camps. The camp usually contains technical buildings and residence does not include family housing or facilities. The building and ease in this camp is mostly comprised of building lasting half that usually fostered by using a combination of wood, prefabricated panels, concrete, brick and others.
- c) Operations Planning Committee (JPG) Camps. The camp is built and maintained by funding from JPG conducted by the National Security Division, Department of Prime Minister and starting in 2008 all matters related aspects of maintenance, development and acquisition left entirely to the MA. Typically, these camps were built in the area of operations and contain only technical building under the category of temporary buildings. These camps are now used for operation and training.

2.7.3 Maintenance Concept

Briefly, maintenance activities include repairing, restoring and replacing a damaged or broken or worn out through general and specific maintenance. Infrastructure maintenance begins once acquired from implementing agencies until the building or facility off or no longer economical to repair. The types of maintenance are classified as follows:

- a) Scheduled Maintenance. Maintenance work is carried out in accordance with a predetermined period such as repainting (5 years), rewiring, re-installation of water supply and sewerage system (20 years).
- b) Annual Maintenance. Maintenance is often the case, such as damage to the fan, floor damage, repair broken drains and so on.
- c) Emergency Maintenance. Maintenance immediate corrective action should be taken to avoid damage worse and endanger occupants. It also includes maintenance due to the storm, flood or other natural disaster.
- d) Maintenance and Repairs. This maintenance includes preventive maintenance work, which needs to be implemented on a structure, or building before the prescribed period, to prevent further damage as a result of the original material used is not appropriate and to avoid high maintenance cost becomes.

2.7.4 Implementing Agency

Based on the existing MAF policy, implementing agencies officially recognized by the government is the Public Works Department (JKR) and the Defence Construction and Engineering Division (BPKP). While for the camps under JPG maintenance work carried out by a team of Royal Engineers Regiment (RAJD).

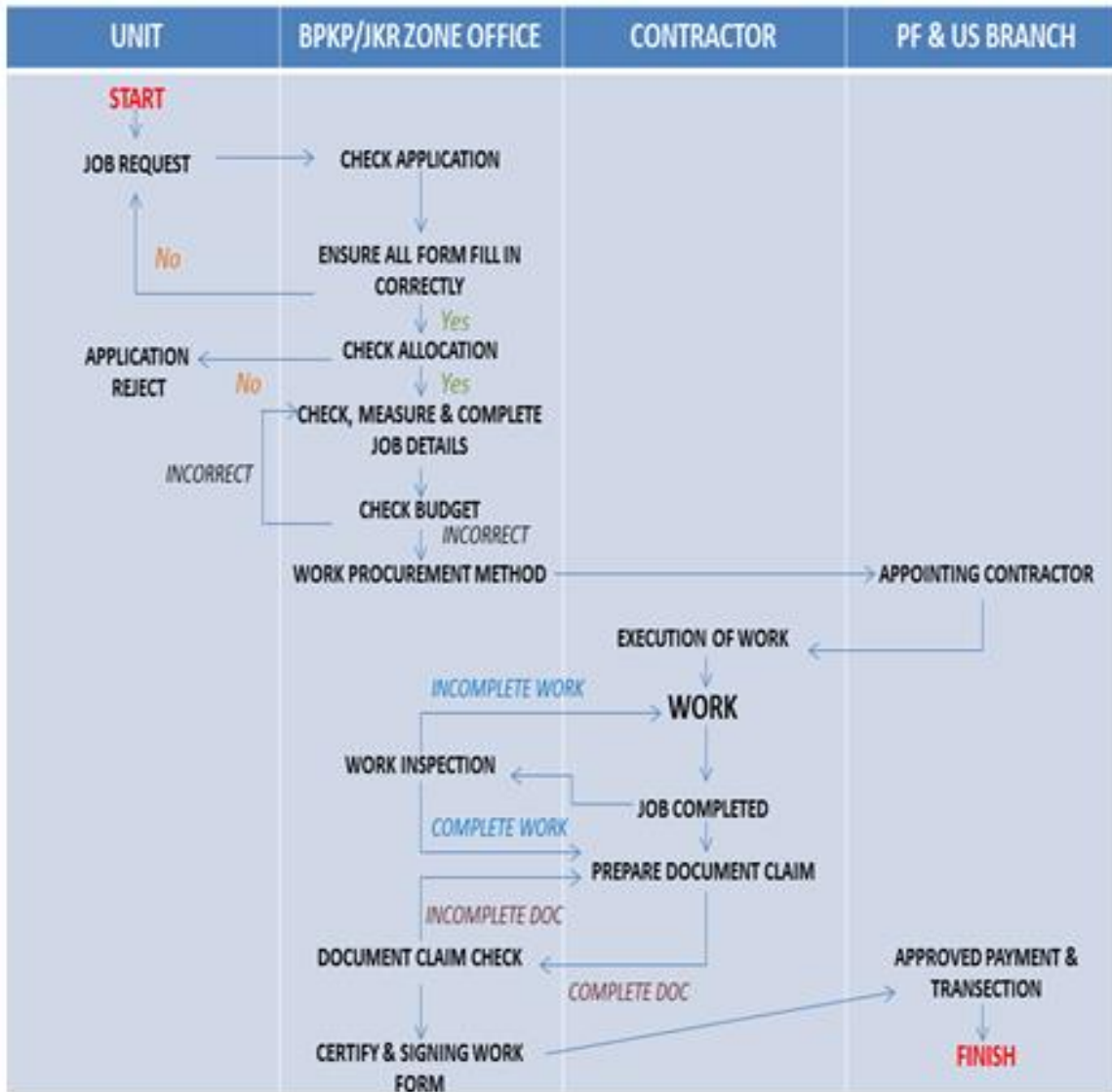


Figure 2.7.4: Maintenance Work Process of BPKP/JKR

2.8 CONCLUSION

This research is very importance to continue the previous research. This is to highlight that the effective decision making must have a model as a basis and this chapter, we emphasis on the rational model, whereby the decision making process can be broken down into six steps can be used in managing building maintenance. This is because the decision making can give positive impact and negative effect to the organization especially in doing maintenance work. It also can be one of the factors of effective and efficient building maintenance work and quality of work. In this research, the questionnaire will be developing to give to the residents of the RKAT which involve officer and other rank who lived in the married quarters. In the questionnaire, the respondents have to answer the management responsibility, maintenance work process and quality of the building maintenance that they usually faced as residents. From the answer and respond, we can examine and evaluate on the maintenance building work and management system ultimately how it does reflect the effective decision making.

Some of the literature reviews show that the researchers have similar opinions on maintenance strategies such as corrective, preventive and condition-based maintenance. From those literature reviews also, good information can be obtained particularly on decision making in maintenance cost which is consist of 5 main groups. We can study on how the relationship between decision making and cost occurred. The similarity on maintenance and building services applied in military organization and being practiced with additional concept by the respective implementing agency.

The main concern about building maintenance and management system is paramount for those residents, the awareness of their responsibility to helping the management. It can help both parties especially the management as a client and residents as their customer. Besides that, by correctly understanding what is building maintenance and responsibility can also avoid some issues regarding users dissatisfactory, avoid too many complaint, misunderstanding or do not understand the practices and procedures and many others issues in particular. From the entire unsavoury situation, could trigger a dissatisfactory and conflict in management and organization. This topic will generate a recommendation and solution that can be applied by management personnel to enhance their managing aspects in term of decision making.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Basically, this chapter provides the information regarding instrument/methods that were conducted during collecting data. The purpose of this chapter is to introduce the research strategy and techniques applied. The survey research method has been chosen to determine the effectiveness of decision making in building maintenance and management system. The main data collection techniques used in this research study is questionnaires.

3.2 RESEARCH DESIGN

Quantitative approach is used in this research study. According to (Cassell and Symon, 1995), the most importance is the measurement is reliable, valid and generalizable in its clear predictions of cause and effect. Quantitative research is a numerical and seen to be more valid in interpreting data. In this research method, a set of questionnaire will be used to evaluate the current practices of the existing maintenance procedure. Thus, eventually to examine the management approach on decision making in implementing maintenance work.

To suite with the research topic, a questionnaire is used as a methodology because it's more relevant and convenient as compare to others method. Another reason is time efficiency for distribution and data collection from the respondents. According to (Milne, 1999), questionnaires is very popular tools that is being used in most research because survey questionnaire are straight forward questions as compare to interview and in design in a standardize mean with close ended questions. The data collections are much easier to analyse and interpret.

The surveys ask about how they define the maintenance work at their place and the maintenance process been conducted. The questionnaire designed to gather the data about the management practices in doing the maintenance work, the need for maintenance between client's and user's value system, ultimately contribute toward effective decision making. The result is analyzed and come out with solution to overcome the problems. Since the respondents are come from different level of residents, the question designed is suitable to them.

3.3 POPULATION AND SAMPLE

The study group for this research will be the officers and other rank those who are residents of military married quarters (RKAT) is the respondent in the selected married quarters from the different implementing agency; JKR and BPKP to conduct the study. The respondent expected to have experienced in living at the married quarters in military base, Kem Batu 10, Kuantan and have an idea about the maintenance work conducted to their place in particular and the married quarters in general.

The sample that is preferred for this research is 300 of respondents consist of officers and other rank from two different location of married quarters and the maintenance did by different implementing agency by using simple random sampling.

3.4 RESEARCH METHOD

Type of survey used in this study is in questionnaires form. The questionnaires are adapted from many resources that related to this study and change the preference to this study. The questions are formulated based on objective and research questions of this research.

The residents of the married quarters might have difference perspective and experienced about the maintenance work. The data collection will be analysed because the respondent may have different experienced about the building maintenance and management system especially for newly married and first time living in married quarters as compare to those who are used to it for many time and places. This will be possible to gain better understanding about different perspective from the respondent.

3.5 DESIGN OF QUESTIONNAIRE

In order to achieve the aim of this study, questionnaires data collections are used to evaluate the maintenance process, and also to examine the management approach on decision making in implementing maintenance work. Notwithstanding, the main idea of this method being used is to identify the effectiveness of decision making on conducting the maintenance work in the organization.

A question was asked to evaluate the maintenance process and management approach in decision making. The questionnaire consists of 2 parts and comprises of 30 questions with 2 sections A and B. Section A contains 13 questions about respondents' demographic profile; age, ethnic, gender, work position experience, rank structure, family size and others with format of close-ended questions by tick one significant answer. In section B consists of 16 questions to examine the building maintenance and management system. As an overall, questions design is close ended questions with scale of measurement use Likart scale. The last question in this section is general statement questions asking respondent's overall view pertaining the topic of best approach that can be used to link the need between client's and user's for the purpose that contribute effective decision making.

The Likert scale is commonly use in this kind of survey, ranked by number 1 until 5. Number 1 denotes the strongly disagree, disagree, sometimes (neutral), agree, and lastly is number 5 denote strongly agree. The sample of the Likert scale can be seen below in the Table 3.5.

Table 3.5: Sample of Likert Scale

	1	2	3	4	5
Question 1					
Question 2					

PLEASE TICK (✓) THE BEST ANSWER ACCORDING TO THE SCALE
(1-Strongly Disagree, 2-Disagree, 3-Sometimes, 4-Agree, 5-Strongly Agree)

The questionnaire was prepared in dual languages; Malay and English, to help the respondents in answering confidently and avoid misunderstanding of the questions being asked. In this survey, correct answers will help researchers in doing the analysis without any ambiguity and vagueness. Thus, the reliability and validity of the questionnaires can be met correctly.

3.6 METHOD OF DATA ANALYSIS

During the collection of data, a well-structured database, which later conducts an analysis. Data analysis will be conducted using Statistical Package for Social Sciences (SPSS). From the analysis of data, it is able to show a number of recommendations of the case in the married quarter's community. Then, the data analysis, the conclusions can be drawn and recommendations to their higher authority. According to Wimmer & Dominick (2003), they suggest that the topic has to be examined from different perspectives so it can help to be more confident in findings. According to Zikmund (2003), a survey is useful in identifying characteristics of particular groups to measure their attitude and behavior category. The designed questionnaires will be distributed to the target respondents by hand.

3.6.1 Calculate Mean

In order to analyze the results that are obtained from the targeted respondents from the Likert scale that is being used in the questionnaire, the formula of getting average or mean will be used. All of the answers need to be summed up and divided with the numbers of questions. The formula to find average which is also known as mean, is as follows:

Mean = Sum of all the observed values ÷ number of observations

OR

$$\mu = \frac{\Sigma x}{n}$$

μ = the mean value of x

n = the number of observations in the data set

Σx = the sum of all observed values

3.6.2 Statistical Package for Social Sciences (SPSS)

All of data obtain from the survey questionnaire will be analyse by using SPSS software. SPSS is stand for Statistical Package for Social Sciences. According to Flinders University (2013), SPSS is software or a computer application that provides statistical analysis of data. It can be used to perform data entry and analysis and to create tables and graphs. Besides that, SPSS can also detect the validity and reliability of the research results. This software has specific data analysis procedure that will be used to analyse the entire results of this study. All of the data will be analysed using this software and the analysing process are divided into two groups which are section A and section B. This software will produce results and table or graphs that indicate the results for each section separately.

3.7 CONCLUSION

This chapter analyses the strategy and techniques in this research to determine the effectiveness of decision making in building maintenance and management system. The target respondent is from the officers and other rank families who are living in the married quarters. From this chapter, the questionnaire is designed to be survey for the respondent.

Many types of method, way and mean are available to do an analysis especially in quantitative analysis. However, this study is using survey questionnaire as a main methods to collect data and information from the respondents. Good selection of research method is important in producing valid and reliable results. Thus, the research or study will become very useful and beneficial for others. So, it is very important for researchers to use appropriate methods in order to get good result for their research.

CHAPTER 4

DATA COLLECTION AND ANALYSIS

4.1 INTRODUCTION

This chapter shows the result of research data analysis using Statistical Package for Social Sciences (SPSS). Descriptive statistic is summary of research data which present in a proper manner, easier to understandable. The summary of the descriptive analysis represent the required information. Meanwhile, in descriptive data, the data that include is demographic data and the variable descriptive information.

The data were collected, processed and tested in response to the problems posed in the earlier part of this study. Study protocol conducted by Pilot test and follow by Descriptive analysis and Crosstabs, Reliability analysis, Normality, Mean analysis and Correlation analysis were carried out in this chapter. The result of data analysis were presented in table and figure ways, so that more clearly and easy to understand. The analysis is discussed first, followed by the presentation of quantitative findings of the respondents.

In order to understand in-depth the research methods and analysis, it's paramount to recapitulate the study sought to determine:

1) Research Objectives:

- To identify the management approach on decision-making in implementing maintenance work.

- To evaluate the current practices of the existing maintenance procedure used in the maintenance process.

2) Research Questions:

- What are the management approaches on decision-making in implementing maintenance work?
- What are the current practices of the existing maintenance procedure used in the maintenance process?

In this research, 300 residents of servicemen and servicewomen who are living in military married quarters (RKAT) at Kem Batu 10, Kuantan, Pahang were being randomly selected. Thus, 300 set of questionnaires were successfully distributed by meeting them in three different units' respectively. However, there are only 275 set of questionnaire were managed to collected and 25 set of questionnaire unreturned from respondents, consider missing data and were, therefore, removed from the set of data to be analyzed. Thus there only 275 set of questionnaire were used for data analysis. Overall, respond rate has achieved 91.67%.

4.2 PILOT STUDY

Pilot test is a smaller version of a larger study that is conducted to prepare for the actual implementation of the research. It used as a *feasibility study*, to ensure that the ideas or methods behind a research idea are appropriate, and in the study protocol before launching a larger study. For this research, 15 respondents from respective positions and appointments, key principle officer and officer in-charge on managing maintenance and financial are chosen to take part in the pilot test. An Answer from 15 respondents is taken the test and the table above shows the Cronbach's Alpha is 0.724 within 16 questions.

The result of the pilot study shows that the data is reliable for overall data before the actual research is launched. Thus, the researcher can go further with the research and can discuss in detail the result of the study.

4.2.1 Reliability Analysis

According to **Craig and Janes (2003)**, Cronbach's Alpha is the most commonly ways used to measure of reliability. Cronbach's Alpha can be ranges from 0 to 1.00, the values close to 1.00 shows high consistency and more reliable, in contrast, the Cronbach's Alpha is far from 1.00 indicate the data is not consistency and not reliable. If the alpha shows between 0.5 to 0.7 it consider as acceptable level, if the alpha more than 0.7 is consider in good level.

Reliability analysis allows researchers to study the properties of measurement scales and the items that make them reliable, or otherwise. Cronbach's Alpha is the most common measure of reliability. It is commonly used when researchers have Likert scale questions in a survey or questionnaire that forms a scale. Cronbach's Alpha is used to determine if the scale is reliable. Interpretation scale of Cronbach's Alpha tests results were $\alpha > 0.9$ for excellent, $\alpha > 0.8$ for good, $\alpha > 0.7$ for acceptable, $\alpha > 0.6$ for questionable, $\alpha > 0.5$ for poor and $\alpha > 0.5$ for unacceptable.

Reliability test is undertaken to determine whether the questions included in the questionnaire are reliable or not. Cronbach's Alpha is a reliability coefficient that indicates how well the items in set were positively correlated with one another. The closer the reliability coefficient gets to 1.0, the better. In general, reliabilities of less 0.60 are considered to be poor, those in the 0.70 are acceptable, and those over 0.80 are good. A Cronbach's Alpha coefficient which is more than 0.70 or higher is acceptable suggested by **Cavan et al., (2001)**.

Table 4.2.1: Reliability Analysis

Reliability Statistics		
Cronbach's Alpha	N of Items	
.724	4	

Variable	Number of Item	Cronbach's Alpha Value
Decision Making	5	.832
Building Maintenance	4	.805
Quality Maintenance	5	.856
Budget Allocation	2	.692

The value of Cronbach's Alpha of variable in this study is shown in Table 4.2.1. The analysis in this study declares that the Cronbach's Alpha value range from 0.692 to 0.856 and, thus, implied that the data is good and at an acceptable level. Decision making is represented to as the dependent variable. Meanwhile building maintenance, quality maintenance and budget allocation are represented as the independent variables. Reliability for the overall sample test is **0.724**.

Rahmi (2010), claimed that Cronbach's Alpha is a reliability coefficient that indicates how well the items in a set were positively correlated with one another or inter-items consistency measure. The data on Table 4.2.1 shows that the reliability is acceptable because Cronbach's Alpha for service quality and decision making is over 0.70. Budget allocation has the lowest Cronbach's Alpha is which is 0.692, followed by building maintenance with 0.805, quality maintenance with 0.856.

4.3 NORMALITY TEST

Normality test is carried out to determine whether the given distribution is symmetrical or not, as compared to the normal curve. A zero value of *skewness* implies a symmetric distribution or the data are perfectly symmetrical. In order to determine whether the variable is positively distributed or negative skewed, the difference of the total mean and the total median for the variable is computed. *If the total median is greater than total mean, it presents a distribution which is positively skewed. In contrast, when the total mean is greater than total median, it implies a negatively skewed distribution.* The *skewness and kurtosis* must be in the range of $-2 < x < 2$.

4.3.1 Distribution Analysis

This analysis has been conducted in order *to determine the mean of the variables.* Besides, it is also aimed to determine the normality of the distribution for the research variables.

Table 4.3.1: Distribution Analysis

		Statistic	Std. Error
Decision Making	Mean	3.4065	.03710
	95% Confidence Interval for Mean		
	Lower Bound	3.3335	
	Upper Bound	3.4796	
	5% Trimmed Mean	3.4622	
	Median	3.6000	
	Variance	.378	
	Std. Deviation	.61522	
	Minimum	1.00	
	Maximum	4.40	
	Range	3.40	
	Interquartile Range	.80	
	Skewness	-1.268	.147
	Kurtosis	1.615	.293

Table 4.3.1: Continued**Descriptive**

		Statistic	Std. Error
Building Maintenance	Mean	2.3100	.03413
	95% Confidence Interval for		
	Mean		
	Lower Bound	2.2428	
	Upper Bound	2.3772	
	5% Trimmed Mean	2.2551	
	Median	2.0000	
	Variance	.320	
	Std. Deviation	.56594	
	Minimum	1.00	
	Maximum	5.00	
	Range	4.00	
	Interquartile Range	.50	
	Skewness	1.892	.147
Kurtosis	4.684	.293	
Quality Maintenance	Mean	3.4436	.03716
	95% Confidence Interval for		
	Mean		
	Lower Bound	3.3705	
	Upper Bound	3.5168	
	5% Trimmed Mean	3.4978	
	Median	3.6000	
	Variance	.380	
	Std. Deviation	.61619	
	Minimum	1.00	
	Maximum	4.40	
	Range	3.40	
	Interquartile Range	.80	
	Skewness	-1.399	.147
Kurtosis	2.320	.293	

Table 4.3.1: Continued**Descriptive**

		Statistic	Std. Error
Budget Allocation	Mean	3.4073	.04316
	95% Confidence Interval for Lower Bound	3.3223	
	Mean Upper Bound	3.4922	
	5% Trimmed Mean	3.4545	
	Median	3.5000	
	Variance	.512	
	Std. Deviation	.71579	
	Minimum	1.00	
	Maximum	5.00	
	Range	4.00	
	Interquartile Range	1.00	
	Skewness	-1.039	.147
	Kurtosis	.747	.293

Table 4.3.1. shows that variables in this research are determined to be of normal distribution. A perfect symmetrical distribution will have the skewness of 0.

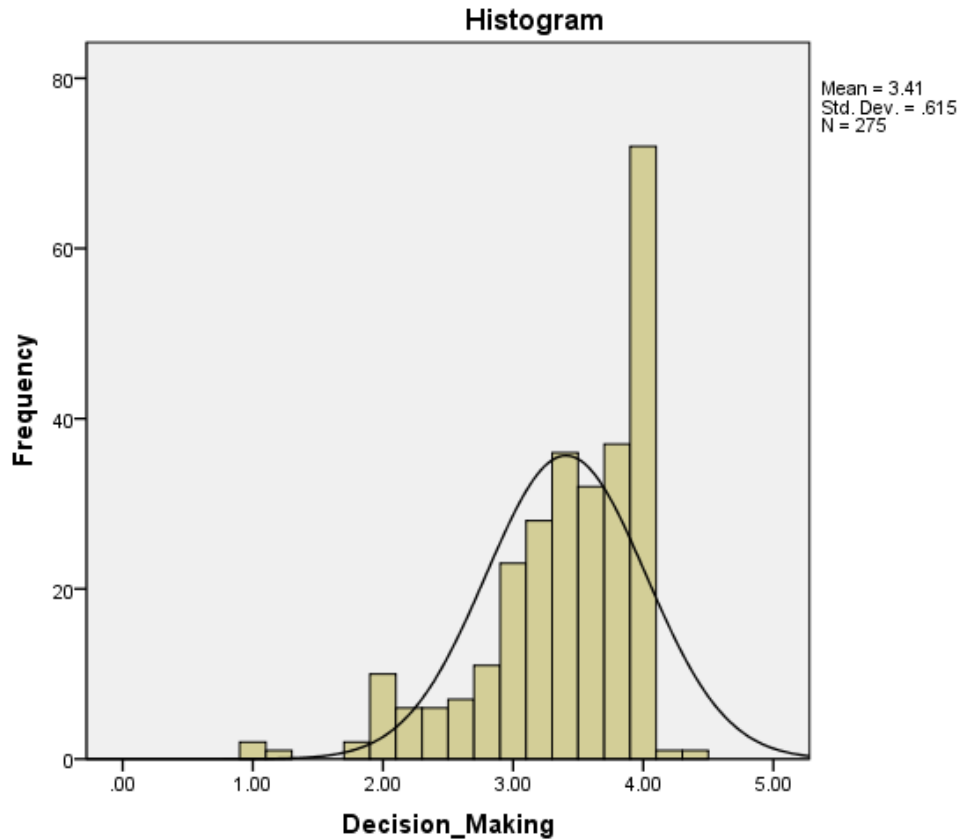


Figure 4.3.1.1: Distribution Analysis for Decision Making

The total mean for decision making variable is 3.4065. Meanwhile, the total median for decision making is 3.6000. Thus, it shows that the total median is greater than the total mean, and therefore, created a curve that is positively skewed, from -0.1935 as illustrated in Figure 4.3.1.1. The skewness value is -1.268 and kurtosis value is 1.615. So skewness z value is -8.6258 and the kurtosis z value is 5.5119. We can therefore, conclude that the variable decision making is not normally distributed. The histogram does not present a symmetrical distribution; it has a long tail towards the left.

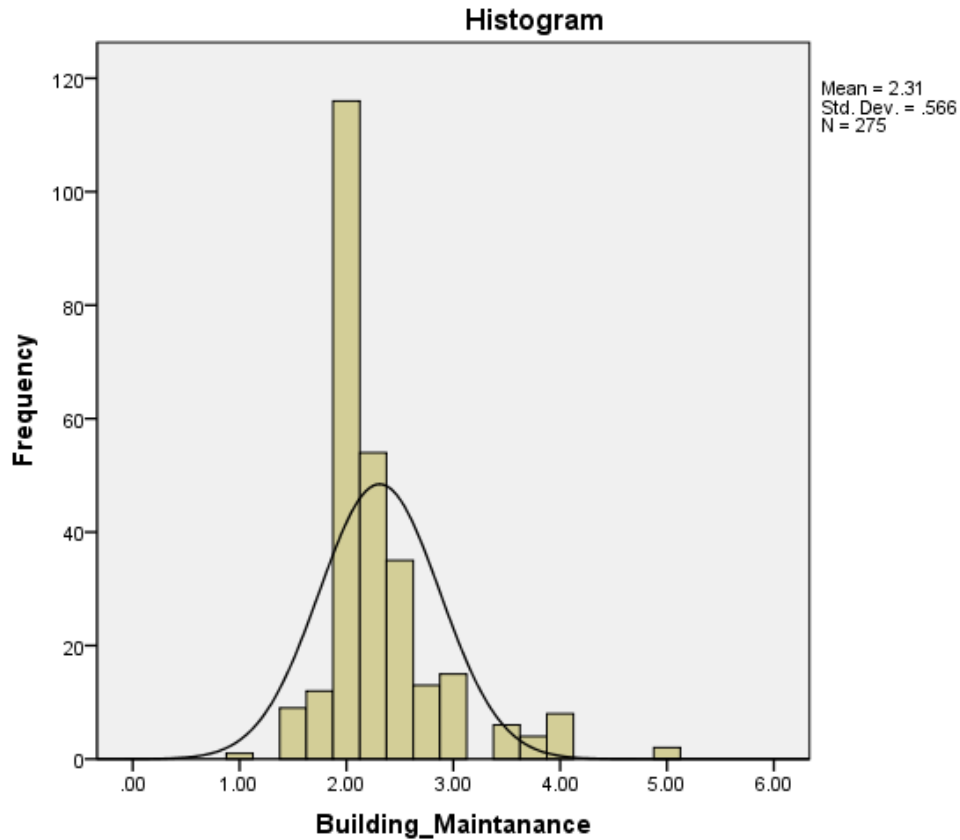


Figure 4.3.1.2: Distribution Analysis for Building Maintenance

For the variables under building maintenance, the total mean is 2.3100 and the total median is 2.0000. For this variable, it shows that the total mean is greater than total median. So, it is also negatively skewed and the value is 0.3100 as illustrated in Figure 4.3.1.2. The skewness value is 1.892 and kurtosis value is 4.684. So skewness z value is 12.8707 and the kurtosis z value is 15.9863. We can therefore, conclude that the variable building maintenance is not normally distributed. The histogram does not present a symmetrical distribution; it has a long tail towards the right.

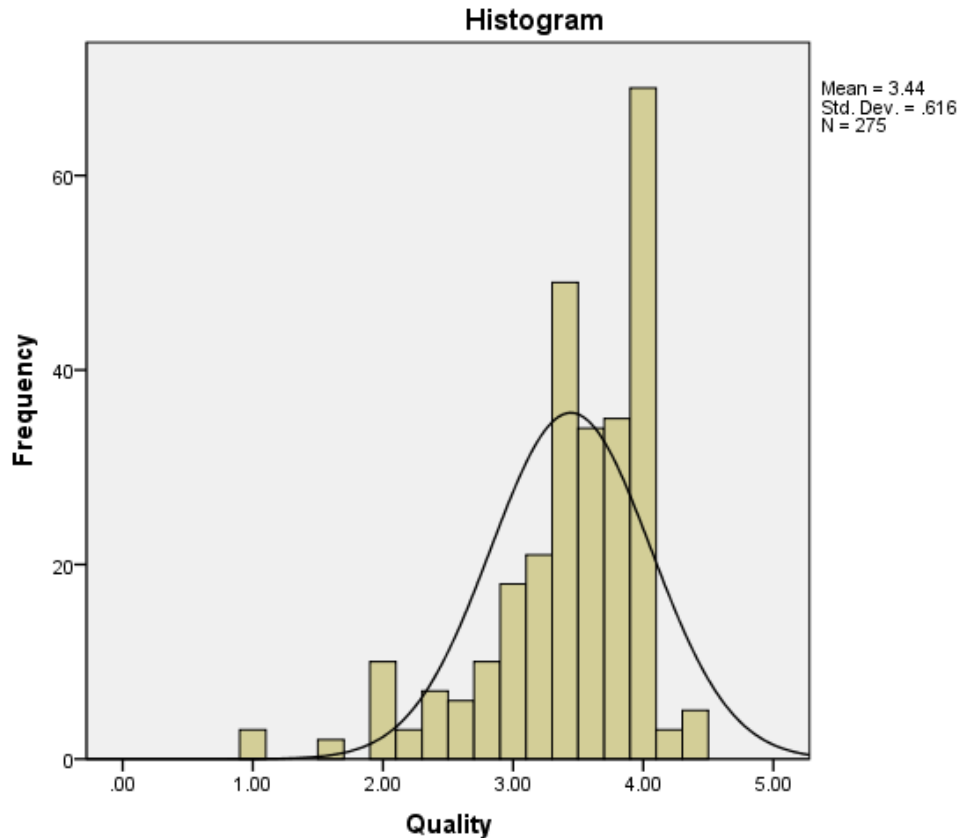


Figure 4.3.1.3: Distribution Analysis for Quality

For the variables under quality maintenance, the total mean is 3.4436 and the total median is 3.6000. For this variable, it shows that the total median is greater than total mean. So, it is positively skewed with the value of -0.1564 as illustrated in Figure 4.3.1.3. The skewness value is -1.399 and kurtosis value is 2.320. So skewness z value is -9.5170 and the kurtosis z value is 7.9180. We can therefore, conclude that the variable quality maintenance is not normally distributed. The histogram does not present a symmetrical distribution; it has a long tail towards the left.

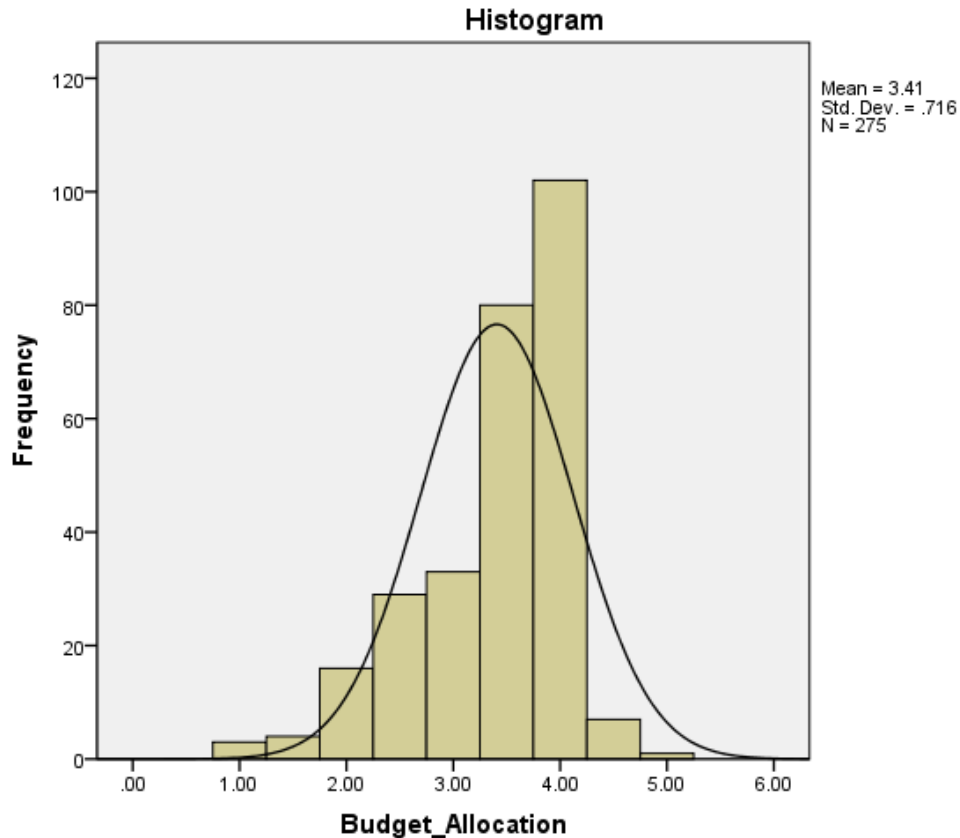


Figure 4.3.1.4: Distribution Analysis for Budget Allocation

The budget allocation variables had the total mean of 3.4073, and meanwhile the total median is 3.5000. For this variable, the distribution is a positively skewed because the total median is greater than the total mean value, represented by -0.0927 and illustrated in Figure 4.3.1.4. The skewness value is -1.039 and kurtosis value is 0.747. So skewness z value is -7.0680 and the kurtosis z value is 2.5494. We can therefore, conclude that the variable budget allocation is not normally distributed. The histogram does not present a symmetrical distribution; it has a long tail towards the left.

4.3.2 Normality Analysis

According to (Lead Metropolitan University, 2009), when the sample size is greater than 50, *Kolmogorov-Smirnova* column is used. From the Table 4.3.2, all the variables have p-value smaller than alpha 0.05 which means that the entire variable is normally distributed.

The value which is lesser or equal to 0.05 is considered normally distributed, and if it is more than 0.05, it is considered to be not normally distributed.

Table 4.3.2: Normality Analysis

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Building Maintenance	.240	275	.000	.788	275	.000
Quality Maintenance	.181	275	.000	.871	275	.000
Budget Allocation	.242	275	.000	.865	275	.000
Decision Making	.160	275	.000	.870	275	.000

a. Lilliefors Significance Correction

These four variables which are decision making, building maintenance, quality maintenance, and budget allocation are normally distributed due to the large sample size. The conclusion can be made that a data had a good evidence of being normally distributed as stated by *Hasnah et al., (2006)*.

Table 4.3.2, shows the significance level for the variables namely; decision making (0.000), building maintenance (0.000), quality maintenance (0.000), and budget allocation (0.000). Further, it illustrates that the data is normally distributed.

4.4 CORRELATION ANALYSIS

Correlation is a technique for investigating the relationship between two quantitative, continuous variables. Correlation is a very important element in order to answer the research objectives to ascertain if the goals of the research are achieved or not. The objective of this study is to examine the relation between dependent and independent variables. The dependent variable is decision making while the independent variables are building maintenance, quality maintenance and budget allocation.

With SPSS, Pearson correlation coefficient can be calculated to determine the *strength* and the *direction* of the relationship between two variables. Pearson correlation coefficient r can take values from -1 to +1. The *size* of the absolute value of the coefficient indicates the strength of the relationship, the *sign* (+ or -) indicates the direction.

Pearson correlation analysis is used to identify how one variable is related to another. Correlation goes from zero to one. If there is perfect correlation between variables, then there will be correlation of 1. If there is no relationship, the correlation will be zero. From the Pearson Correlation coefficients, it can be determined if the variables are positively or negatively related. The direction of relationship is indicated by the sign of the correlation coefficient. Positively values of r indicated that the relationship is positively linear, where negative values of r indicated negative linear relationship (*Stangor, 2004*).

Pearson Correlation Analysis is tabulated to show the strength and direction linear relationship between two quantitative variables. It should be remembered that Pearson's correlation only provides information about the *direction and strength* of the variables' linearity. *Zikmund (2003)* describes Pearson correlation coefficient as being used to analyze the strength of the linear relationship between independent variable and dependent variable and the direction of such a relationship.

A positive Pearson correlation value with significant of $p < 0.01$ indicates that there is a positive relationship between the two variables chosen for the test and the probability of the relationship not being true is one percent or less, that is more than ninety-nine percent of the time can be expect this correlation to exist (*Cavana, et al.,2001*). If the p value for all

variables is smaller than 0.01 which means that the probability of the positive relationship between all variables as stated above for not being true is only one percent or less.

Table 4.4: Pearson Correlation

		Correlations			
		DM	BM	Quality	Budget
DM	Pearson Correlation	1	-.480**	.629**	.550**
	Sig. (2-tailed)		.000	.000	.000
	N	275	275	275	275
BM	Pearson Correlation	-.480**	1	-.674**	-.576**
	Sig. (2-tailed)	.000		.000	.000
	N	275	275	275	275
Quality	Pearson Correlation	.629**	-.674**	1	.781**
	Sig. (2-tailed)	.000	.000		.000
	N	275	275	275	275
Budget	Pearson Correlation	.550**	-.576**	.781**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	275	275	275	275

** . Correlation is significant at the 0.01 level (2-tailed).

From table 4.4, the variables are positively and negatively correlated each other. This is because the significant at the level, set at 0.01 (two tailed test) value or known as p-value for all variables is 0.00. Since this correlation as computed using the Person correlation presented values closer to 1, there is a moderate to strong relationship between variables.

The highest value of Pearson correlation is 0.781 which is the correlation between quality and budget and p-value for two tailed test is less than 0.05. Based on the table, it can be concluded that there is strong relationship between quality and budget and correlation is significant at the 0.01 level. The second highest is the correlation between decision making and quality with value of r 0.629 which can be classified as a moderate to strong significant correlative relationship between variables at the 0.01 level. The lowest value of Pearson correlation (-0.480) exists between decision making and building maintenance. It shows a weak negatively relationship between variables which is significant at the 0.01 level. Then, the second lowest is the correlation between building maintenance and budget with value of r

-0.576 which can be classified as moderate negatively relationship between correlations of variable at a 0.01 significant level.

The result of correlation indicates that there is significant relationship between decision making and quality with 0.629 which can be classified as moderate relationship between correlative variables at 0.01 significant levels. The result of correlation indicates that there are significant relationships between decision making and budget at 0.550 which can be classified to have a moderate relationship between correlative variable at the 0.01 significant level. Further, the result of negatively correlation indicates that there are significant relationships between building maintenance and quality with -.0674 and 0.00 significant value. It can be classified as moderate between correlative variable.

Table 4.4.1: Pearson Correlation Coefficient

Coefficient range	Strength
± 0.91 to ± 1.0	Very Strong
± 0.71 to ± 0.90	Strong
± 0.41 to ± 0.70	Moderate strong
± 0.21 to ± 0.40	Weak but definite Relationship
0 to ± 0.20	Slight, almost negligible

Abstract: Wikipedia (2013)

4.5 DEMOGRAPHIC ANALYSIS

Demographic analysis was conducted to analyse the backgrounds of the respondents based on the questionnaires in section A. The frequencies and percentage for ethnic, gender, age, rank, academic qualification and family size will be presented. Besides, a crosstab (short for cross tabulation) is a summary table, with the emphasis on summary.

Table 4.5: Frequency of Demographic

		Frequency	Percent	Valid Percent	Cumulative Percent
Ethnic	Malay	263	95.6	95.6	95.6
	Indian	3	1.1	1.1	96.7
	Others	9	3.3	3.3	100.0
Gender	Male	256	93.1	93.1	93.1
	Female	19	6.9	6.9	100.0
Age	18-24 Years	46	16.7	16.7	16.7
	25-36 Years	149	54.2	54.2	70.9
	37-49 Years	79	28.7	28.7	99.6
	50 Years Above >	1	.4	.4	100.0
Rank	Pvt-Cpl	195	70.9	70.9	70.9
	Sgt-WO 1	74	26.9	26.9	97.8
	Maj-Lt Col	6	2.2	2.2	100.0
Academic Qualification	SPM	261	94.9	94.9	94.9
	Diploma	9	3.3	3.3	98.2
	Degree	3	1.1	1.1	99.3
	Master/PhD	2	.7	.7	100.0
Family Size	1-2 Members	88	32.0	32.0	32.0
	3-4 Members	137	49.8	49.8	81.8
	5-6 Members	44	16.0	16.0	97.8
	7 Members and Above	6	2.2	2.2	100.0

Table 4.5 illustrates a result from the respondents. At first, ethnic determined races of Malays, India and others (Iban and Bidayuh) whereby from 275 respondents (100%), 263 represent a Malay respondent (95.6%) the highest percentage due to military profession are Malays dominant.

Gender is classified as either male or female. Out of 275 respondents that have been sampled for this research, there are 256 respondents who are males and 19 are females. As presented in Table 4.5, in terms of percentage, male and female respondents is represented by 93.1% and 6.9% respectively. Therefore, the majority of those who answered the questionnaire were male responders. .

The next is an age, consists of four categories; 18-24 years, 25-36 years, 37-49 years, and 50 years and above. From 275 respondents (100%), the highest percentages (54.2%) come under category age between 25-36 years which is 149 respondents. The lowest percentages (0.4%) on category 50 years and above which is 1 respondent. It's show that mostly soldiers at the age between 25-36 are already married and stayed at married military quarters.

There are two categories of soldiers who are living in married military quarters; officer and others rank. Most of the respondent are from others rank, between Pvt-Cpl, contributes the highest percentages (70.9%) with 195 respondents while for an officer respondents, Maj-Lt Col only contributes 2.2% with 6 respondents. It's can be summarize that soldiers at the rank of Pvt-Cpl mostly living at married military quarters because they are not ready to have their own house while for an officers, their allocation are very limited as compared to others rank as priority.

In term of academic qualification, majority of respondent are SPM holders with 261 respondents (94.9%). The highest qualification is Master/PhD with 2 respondents (0.7%).

Lastly, in term of family size; family with 1-2 members contributes 32% out of 88 respondents, family with 3-4 members contributes the highest percentage (49.8%) with 137 respondents, family with 5-6 members contributes 16% from 44 respondents and family with 7 members and above represent the lowest percentage (2.2%) of 6 respondents.

4.5.1 Cross Tabulations

Crosstabs are used for only categorical (discrete) data, that is, group's gender and age, rank and academic qualification, and ethnic and family size. Crosstabs deal with groups or categories for managing data files and cross references. It will help the researcher to do a cross-check the data, making more simplify and showing a group using a bar chart respectively.

Table 4.5.1: Crosstabs Gender*Age

		Gender * Age Crosstabulation					
		Age					
		18-24 Years	25-36 Years	37-49 Years	50 Years	Above >	Total
Gender	Male	Count	44	134	77	1	256
		% of Total	16.0%	48.7%	28.0%	.4%	93.1%
	Female	Count	2	15	2	0	19
		% of Total	.7%	5.5%	.7%	.0%	6.9%
Total		Count	46	149	79	1	275
		% of Total	16.7%	54.2%	28.7%	.4%	100.0%

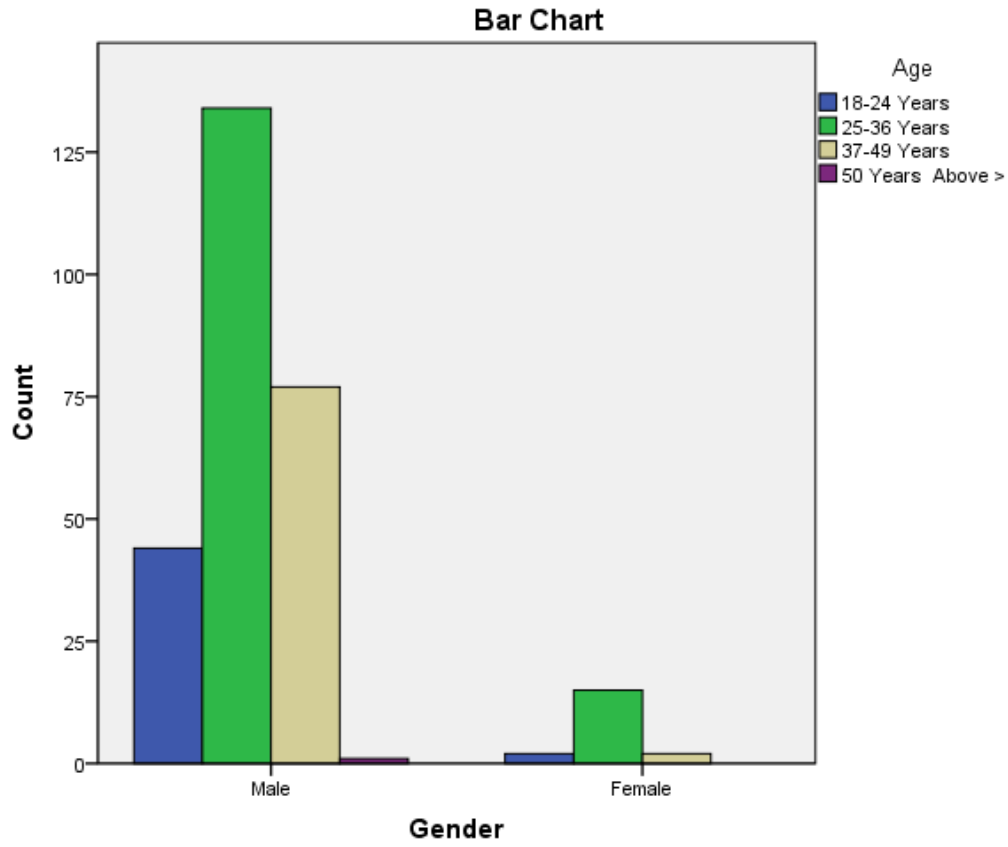


Figure 4.5.1: Bar Chart Gender*Age

Table 4.5.1.1: Crosstabs Rank*Academic Qualification

		Academic Qualification					
		SPM	Diploma	Degree	Master/PhD	Total	
Rank	Pvt-Cpl	Count	192	2	1	0	195
		% of Total	69.8%	.7%	.4%	.0%	70.9%
Sgt-WO 1	Count	68	5	1	0	74	
		% of Total	24.7%	1.8%	.4%	.0%	26.9%
Maj-Lt Col	Count	1	2	1	2	6	
		% of Total	.4%	.7%	.4%	.7%	2.2%
Total	Count	261	9	3	2	275	
		% of Total	94.9%	3.3%	1.1%	.7%	100.0%

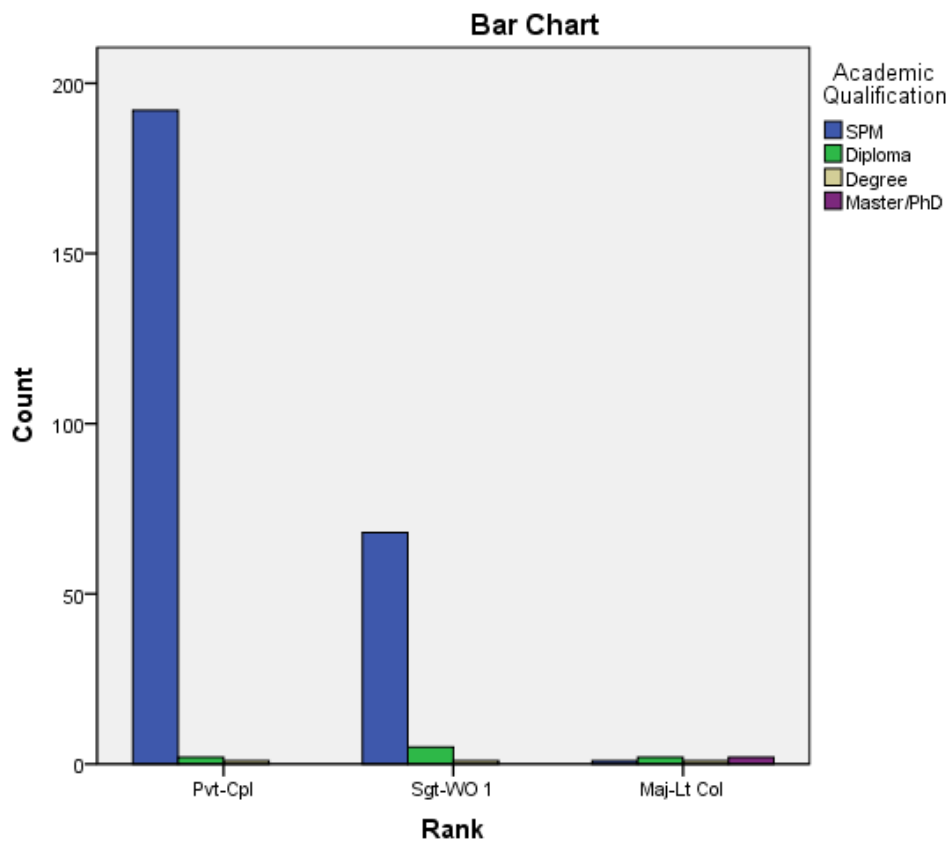
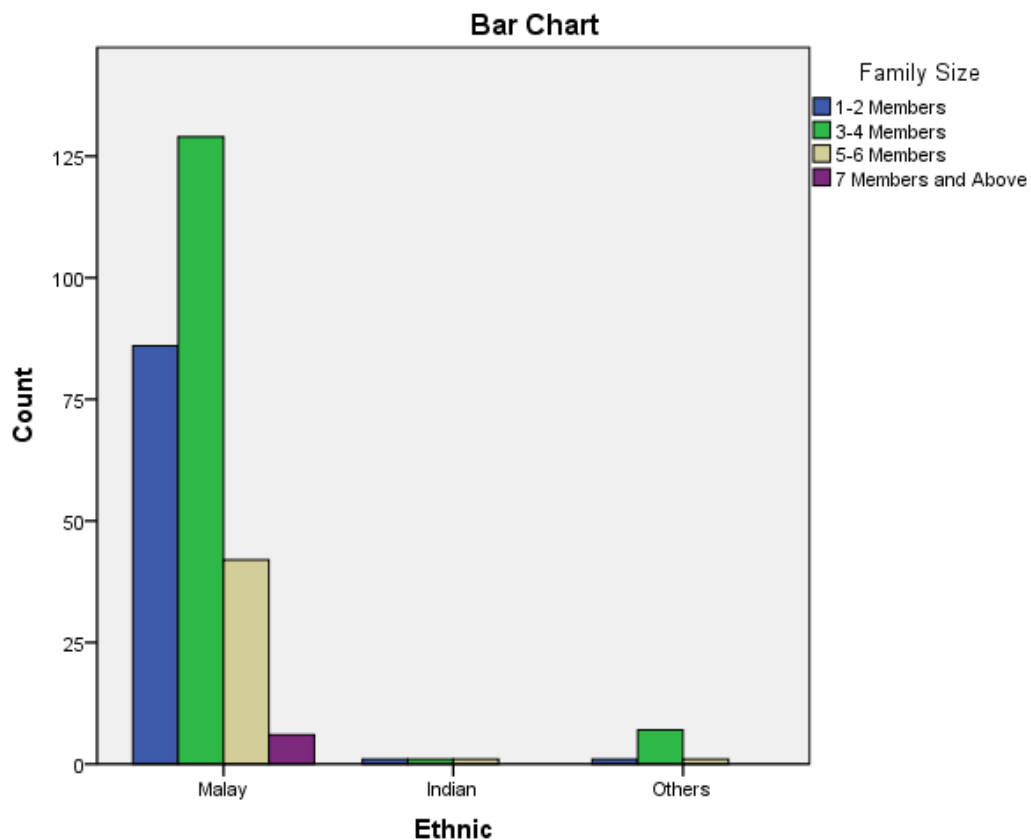
**Figure 4.5.1.1: Bar Chart Rank*Academic Qualification**

Table 4.5.1.2: Crosstabs Ethnic*Family Size

		Ethnic * Family Size Crosstabulation				Total	
		Family Size					
		1-2 Members	3-4 Members	5-6 Members	7 Members and Above		
Ethnic	Malay	Count	86	129	42	6	263
		% of Total	31.3%	46.9%	15.3%	2.2%	95.6%
	Indian	Count	1	1	1	0	3
		% of Total	.4%	.4%	.4%	.0%	1.1%
	Others	Count	1	7	1	0	9
		% of Total	.4%	2.5%	.4%	.0%	3.3%
Total		Count	88	137	44	6	275
		% of Total	32.0%	49.8%	16.0%	2.2%	100.0%

**Figure 4.5.1.2: Bar Chart Ethnic*Family Size**

4.6 CONCLUSION

This chapter presents the findings of the tests on the data that had been collected for this study. The results are derived from reliability analysis, normality analysis and Pearson Correlation analysis. Then, the result will be aligned with the research question in order to find whether the result is significant toward answering the research question or not. The actual research is conducted in three respective units respectively toward officers and others rank who are working at Kem Batu 10, Kuantan. Results analyzed came from the 275 respondents who are living in military married quarters.

The result from the analysis shows that the data is normally distributed. This shows that there is relationship between dependent variable and independent variable. Result from this study represents the important of decision making in managing maintenance and building services which contributes a satisfactory to the residents' of military married quarters.

Result from the Pearson correlation shows that there is moderate to strong relationship between dependent variable and independent variables and the correlation is significant at the 0.01 level. The highest value of correlation is 0.781 which is the correlation between quality and budget and p-value for two tailed test is less than 0.05. The lowest value of Pearson correlation which is 0.550 exists between decision making and budget. It is considered a moderate to strong relationship between variables which is significant at the 0.01 level.

The following chapter displays the resulting data obtained from the trials and discusses the main findings of the study.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter contains the conclusion, limitations and recommendations of the research. All the research objectives and questions expressed in this research will be answered and discussed through this chapter. In addition, all the information, findings and results will be concluded in this chapter.

Conclusion and recommendations will be the last section of this research. At the beginning of this undertaking, the researcher wanted to learn about the managing maintenance and service quality, and it's related toward effective decision making. The orientation of this study is the relationship between independent variables; service quality and dependent variables; decision making. Then, researcher started off with the study by finding out relevant literature, related books, and searched through open sources (internet) on the field of service quality and decision making.

Residential buildings are confronted with the conflict of building decay and deterioration due to the effects of usage, wear and tear (Ozdemir, 2002). Thus, building maintenance is important work to extend the life of the building and preserved it from continuously dysfunction. The purpose of the study is to improve the value of buildings through a proactive managing maintenance and building services system that is based on the concept of value for money. Eventually, building maintenance is to provide a service and is not a product to gain profit. Hence, there is a need a proper maintenance system and puts the building users at the centre of maintenance planning, control, and implementation. Users measure the performance of their building in terms how it can influence of an occupant's

well-being that are in-line with their standards of living and the value of management systems.

Managing maintenance and building services currently practiced are *piece-meal, and* no holistic link involved between the management and users that contribute toward effective decision making.

This research is meant to identify the management approach on decision making focusing on the servicemen and servicewomen who are lived in the military married quarters (RKAT) under 4 Briged Mechanize, Kem Batu 10, Kuantan, Pahang. This study will scope on the management, housing condition and the maintenance work. The research has made use of questionnaires to get the feedback from respondents for data to be unbiased and shared a common interest.

The study focused on the decision making of those who are using the services quality offered by organization. The survey was conducted at three units in 4 Briged Mechanize, Kem Batu 10, Kuantan, Pahang from 14 to 30 September 2015. The questionnaires used have three sections with a total of 30 questions. The first section deals with the demographics profile of respondents; second section deals with independent variables and dependent variables by which respondents must choose from the choices of giving a rating of 1 to 5 used ordinal measurement of scale questions to describe their experiences lived in military married quarters.

The data collected was tabulated, analysed and interpreted using frequency and percentage, cross tabulations, mean, reliability and normality test, Pearson correlation coefficient analysis.

5.2 CONCLUSION

This study enlighten us what factors contribute to the effective decision making that occur while used service quality in the non-profit organization. Through the analysis of data collected, we can find the degree of relationship between the independent variable; service quality, and the dependent variable; decision making. This study can give insights on the issues of managing maintenance and building services that arise to the residents who are lived in military married quarters and how the management can improve their service performance, link between the management and users, and the systems leading toward effective decision making.

Building maintenance is conditionally driven and is usually carried out only when there is budget available, even if the needs are obvious until such a situation when the building becomes unattractive or even unsuitable for its users. Maintenance is a must and cannot be avoided, but what is possible is how to make the building maintenance cost-effective by having a efficient maintenance management and effective building services based on the concept of value for money. Service quality is an important medium for organizations to be successful and consequently improved the performance.

From the theory and data collected, as a result and analysis, we came across useful information in feasibility study that all the variables; decision making, building maintenance, quality maintenance and budget allocation shows that the overall **reliability** is acceptable at 0.724 (Cronbach's Alpha). Decision making (0.832) is represented to as the dependent variable. Meanwhile building maintenance (0.805), quality maintenance (0.856) and budget allocation (0.692) are represented as the independent variables. Thus, it does can be concluded that the independent variables vary in their degree of influence toward decision making.

Statistical analysis on the data collected signifies that there is an **existing distribution** between dependent variables; decision making and the independent variables; building maintenance, quality maintenance and budget allocation. Set at alpha 0.05, correlation coefficient shown that the relationships between building maintenance and decision making, quality maintenance and decision making, budget allocation and decision making, exist with the computed p-values of 0.000 (two-tailed).

Additionally, using the Pearson Correlation to compute the **degree of relationship** between the variables, and the variables indicates that there are positively and negatively correlated each other's; building maintenance and decision making had the turned out with $r = -0.480$ (weak negatively correlated), quality maintenance and decision making with $r = 0.629$ (moderate to strong positively correlated), budget allocation and decision making with $r = 0.550$ (moderate positively correlated). It signifies a **moderate to strong positive relationship**. Hence, we can conclude that not all the independent variables have strong positive relationship with decision making. Among these independent variables, quality maintenance presents the strong positive relationship. A positive relationship means that when the independent variable increases, the dependent variable increases as well.

As a conclusion, this study is considered success, even though there are some of the limitations that cannot be overcome. This is because; all of the objectives of this study are successfully achieved.

5.3 LIMITATION

In the process to complete this research, there are several limitations and challenges that need to be tackled well from the findings and conclusions. This study, carried out for a short period of time, has suffered the challenges of time constraints because the requirement had to be fulfilled as to follow the deadline of the academic calendar. The time constraint has affected both quality and product of this research study in preparing both FYP 1 and FYP 2. In FYP 1, the difficulty of finding an appropriate research title followed by FYP 2 the challenges of collecting a data. There is a situation whereby the topics choose in a right field of study; however facing difficulty in data collection due to some technical errors in term of sample size, respondent's availability and change scope of study that ultimately will affect the research objectives. Thus, the results of this study just for the seat of doing the research without clearly and concisely understood. Therefore, it's would have been strengthened if the research had been conducted in a wise manner and fully guidance through the module itself.

Another major limitation faced in the completion of this research was the fact that implementation being time consuming. This research requires a lot of time to finish, but as a

student, the researcher has to divide time wisely to achieve other important things that a student need such as to participate in classes, do assignments, take test and attend programs. So, time is not fully dedicated and solely devoted to this research. In addition, the researcher has to deal with the company to complete this research which can be done on the weekdays only; creating conflict on schedules as the researcher also has classes to be attended on weekdays.

The best part of it, lack of knowledge on SPSS is another limitation. The researcher needed some time to understand and learn about SPSS and apply it to perform quantitative measurement on the data collected. There was inefficiency in entering data to SPSS software. Because data analysis is crucial, any mistake should be avoided as it will affect data needed for the formulation of the findings.

Lastly, gathering information is also one of the limitations in finishing this research. There is a lot of information needed in order to support this research, but the information that can be obtained from previous research is quite limited. The journals and articles that were really relevant to this research were difficult to find, although articles and journals are available but need to be purchased.

5.4 RECOMMENDATION FOR FUTURE RESEARCH

Based on the finding, some recommendations can be upholds and applied for the future research. Time management is an important element if researchers want to do this kind of study. The research objective is to identify the management approach on decision making and to evaluate the existing maintenance process, ultimately determine the relationship between independent variable and dependent variables. The respondents were focusing on the servicemen and servicewomen who are lived in the military married quarters (RKAT) under 4 Briged Mechanize, Kem Batu 10, Kuantan, Pahang. This research should be conducted in win-win situation whereby the residents get the benefit, and at the same time to uphold organization's reputation. The perception must be corrected; not to blame or find a mistake but to identify and as a corrective measure. I will used this finding to convince my superior and helping my organization to further enhance their management approach toward the managing maintenance and building services in future.

Future researchers should expand the scope of this research. It is recommended that they go more in depth about these topics to find more information to reach a best outcome of research. They can conduct studies instead of decision making, it can further enhance on customer satisfaction (user's or resident's) itself. Similarly, next researchers can come out with topics on the relationship between customer satisfaction and decision making on service quality as well.

To get accurate data analysis through SPSS, every new researcher must be properly acquainted and trained. This is important to ensure that researchers conduct the research properly and come up with data helpful for the organization being studied. Other than that, training is paramount that will improve the performance of researches. This is because the research will be evaluated by a professional body. As mentioned, the limitations are mainly addressed towards the strength of this study. In short, the result of this study can be used to enhance and strengthen future research on the field with increased sample size and added with other domains.

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APPENDIX B

GANTT CHART FOR FYP 2

Progress	Timeline	Week													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Briefing & meet Supervisor															
Finalize questionnaires															
Distribution questionnaires															
Collect questionnaires															
CHAPTER 4															
Analyze data															
CHAPTER 5															
Conclusion & Recommendation															
Submission 1 st draft and poster															
Correction & finalization															
Submit Hardcopy & poster															
Oral Presentation															
Submit correct report & approval for binding															

APPENDIX C

SAMPLE OF QUESTIONNAIRES

OBJECTIVE: This survey is carried out to collect an information about the building maintenance from the residents of military married quarters (RKAT) to find out how satisfied you are with your living conditions and to help improve quality of life in your property toward the management system, maintenance work process and quality services. This survey conducted to fulfil the Final Year Project paper and your participation is highly appreciated. It does consist of 2 sections. Answer all questions in each section.

SECTION A: Demographic Profile.

PLEASE TICK (✓) IN THE BOXES GIVEN BY CHOOSING ONLY ONE OPTION

1. Ethnic

- | | | | |
|------------|--------------------------|----------------------------|--------------------------|
| a. Malay | <input type="checkbox"/> | d. Other (Please Specific) | <input type="checkbox"/> |
| b. Chinese | <input type="checkbox"/> | | |
| c. Indian | <input type="checkbox"/> | | |

2. Gender:

- | | | | |
|---------|--------------------------|-----------|--------------------------|
| a. Male | <input type="checkbox"/> | b. Female | <input type="checkbox"/> |
|---------|--------------------------|-----------|--------------------------|

3. Age:

- | | | | |
|----------------|--------------------------|-----------------------|--------------------------|
| a. 18-24 years | <input type="checkbox"/> | c. 37-49 years | <input type="checkbox"/> |
| b. 25-36 years | <input type="checkbox"/> | d. 50 years and above | <input type="checkbox"/> |

4. Rank:

- | | | | |
|------------|--------------------------|---------------|--------------------------|
| a. Pte-Cpl | <input type="checkbox"/> | c. Lt-Capt | <input type="checkbox"/> |
| b. Sgt-WO1 | <input type="checkbox"/> | d. Maj-Lt Col | <input type="checkbox"/> |

5. Academic Qualification:

- | | | | |
|------------|--------------------------|---------------|--------------------------|
| a. SPM | <input type="checkbox"/> | c. Degree | <input type="checkbox"/> |
| b. Diploma | <input type="checkbox"/> | d. Master/PhD | <input type="checkbox"/> |

6. Family Size:

- | | | | |
|----------------|--------------------------|------------------------|--------------------------|
| a. 1-2 members | <input type="checkbox"/> | c. 5-6 members | <input type="checkbox"/> |
| b. 3-4 members | <input type="checkbox"/> | d. 7 members and above | <input type="checkbox"/> |

7. Staying Period

- | | | | |
|----------------------|--------------------------|----------------------|--------------------------|
| a. Less than 1 years | <input type="checkbox"/> | c. 3-4 years | <input type="checkbox"/> |
| b. 1-2 years | <input type="checkbox"/> | d. More than 5 years | <input type="checkbox"/> |

8. Type of House:

- | | | | |
|----------|--------------------------|-------------|--------------------------|
| a. Flat | <input type="checkbox"/> | c. Terrace | <input type="checkbox"/> |
| b. Condo | <input type="checkbox"/> | d. Bungalow | <input type="checkbox"/> |

9. Unit/Appointment:

SECTION B: Maintenance Management System

PLEASE TICK (✓) IN THE BOXES GIVEN BY CHOOSING ONLY ONE OPTION

10. Do you know the procedure maintenance or repairs if it does occurred?

- | | | | |
|--------|--------------------------|-------|--------------------------|
| a. Yes | <input type="checkbox"/> | b. No | <input type="checkbox"/> |
|--------|--------------------------|-------|--------------------------|

11. Over the last year, how many time you called for maintenance or repairs?

- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| a. Never Called | b. 1-2 Times | c. 3-4 Times | d. More Than 5 Times |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

12. If you called for non-emergency maintenance or repairs (leaky faucet, broken light, malfunction door/window lock, etc) the work was usually completed in:

- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| a. Less than 1 Week | b. 1-2 Weeks | c. 3-4 Weeks | d. More Than 4 Weeks |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

13. If you called for emergency maintenance or repairs (leaking roof, clogged drains, toilet plugged up, broken tiles, etc) the work was usually completed in:

- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| a. Less Than 6 Hours | b. 6-12 Hours | c. 12-24 Hours | d. More than 24 Hours |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Instruction: Please express your opinion on how the degree of maintenance and repairs work and the quality work of RKAT

14. How satisfied are you with the following?

		Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied	Does Not Apply
a.	How easy it was to request for maintenance and repairs and does it follow the standard?					
b.	How well the maintenance and repairs was done with standard and specification?					
c.	How well you were <u>treated</u> by the management and person you contacted for repairs?					
d.	How well the <u>action</u> by the management and person doing the repairs?					

PLEASE TICK (√) AT THE BEST ANSWER ACCORDING TO THE SCALE

(1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree)

15. Do you think the **management for maintenance** is:

		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
a.	Provides you information about maintenance and repair activities of RKAT?					
b.	Meetings and discuss with you related to the problem of maintenance and repairs?					
c.	Proactive to your questions and concerns about maintenance and repairs?					
d.	Responsiveness and given attention to your request for					

services?					
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16. How much do you agree and disagree with the following statement?

		Strongly Disagree (1)	Disagree (2)	Sometime (3)	Agree (4)	Strongly Agree (5)
a.	Is the system of the maintenance and repairs work in orders as per requested, planned and estimated effective?					
b.	Are maintenance workers assigned to job and tasks based on their specialized, professional, knowledge and abilities?					
c.	Does the management appoints experience contractors to handle excessive workloads and specialized skill applications?					
d.	Does the maintenance works provide project status and scheduling in timely manner and on time completed?					
e.	Does the maintenance works and repairs achieved the standard and quality of works by the experience workers?					
f.	Does the management provide information of maintenance cost that carrying out and project cost estimates?					
g.	Does the budget allocation for maintenance and repairs being managed correctly and based on current budget?					
h.	Overall, I am very satisfied with the management system and maintenance and work repair for RKAT					

Thank you for your time taken and cooperation to complete the questionnaire. Your input will enable the management to increase the standard and quality of maintenance and repairs to pursue continuous improvement for the benefit and living standard of RKAT